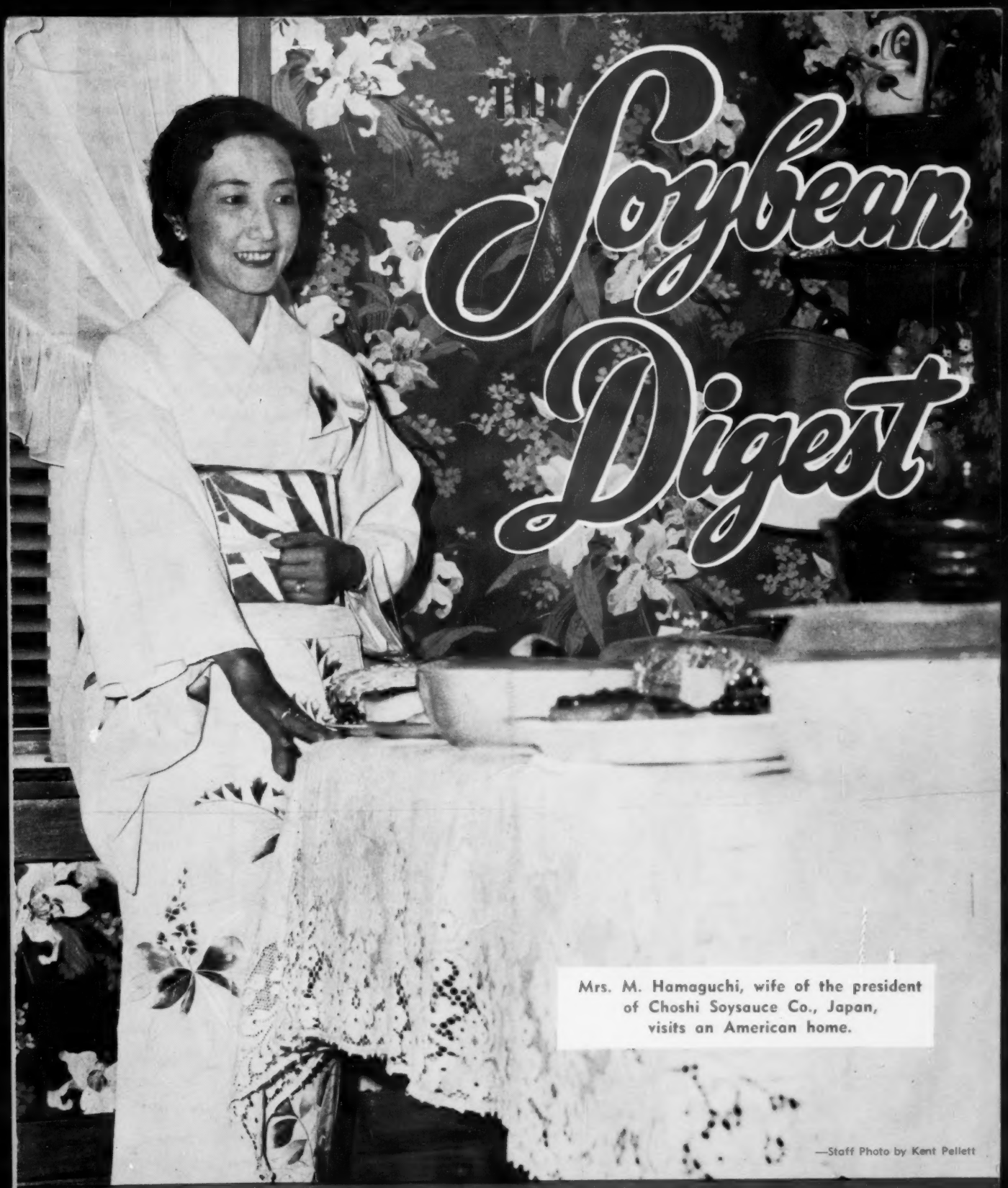

THE Soybean Digest

Mrs. M. Hamaguchi, wife of the president of Choshi Soysauce Co., Japan, visits an American home.

—Staff Photo by Kent Pellett

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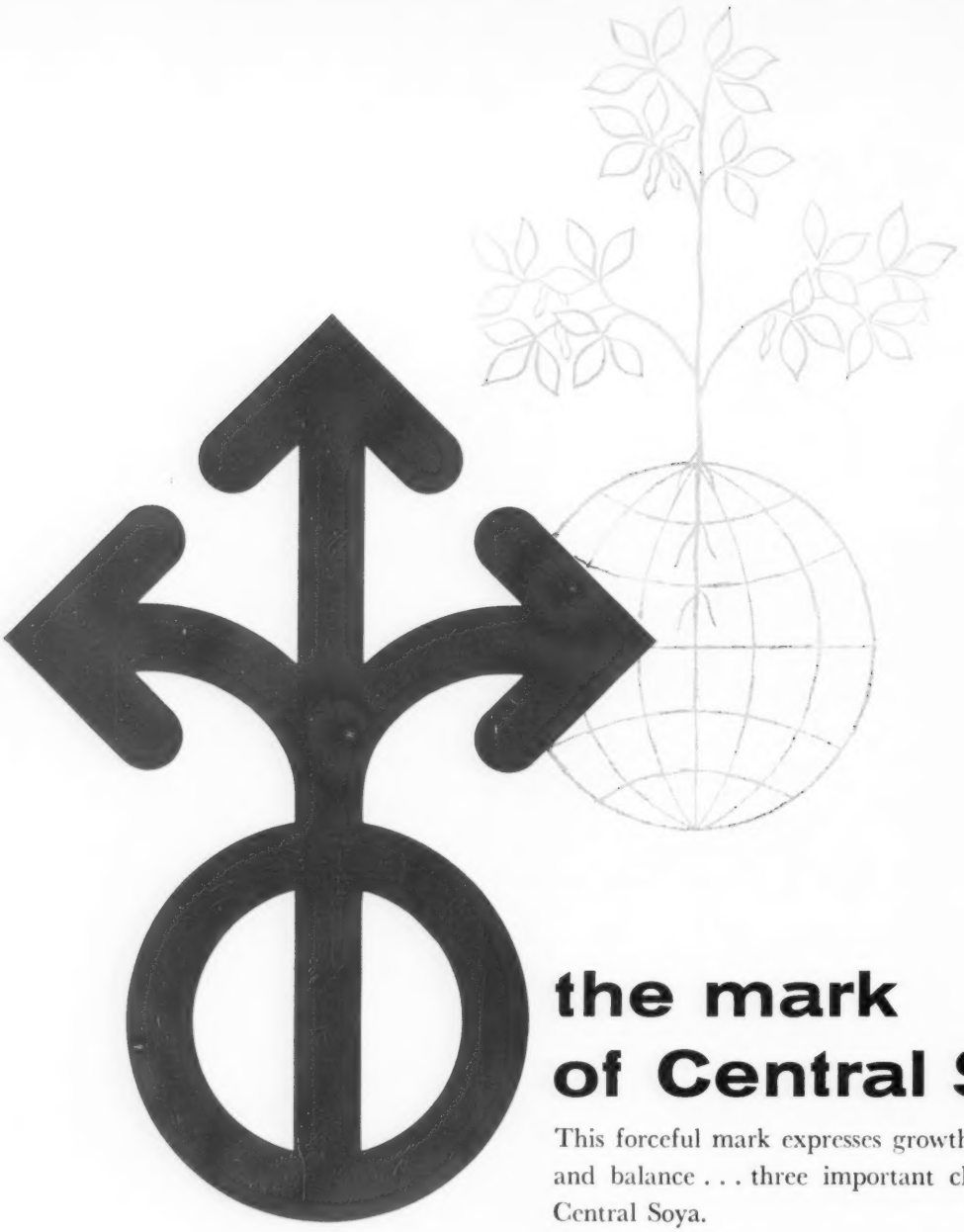

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THE Soybean Digest

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HUDSON, IOWA

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IN THIS ISSUE

THE SOYBEAN DIGEST

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Objectives of the American Soybean Association include the bringing together of all persons interested in the production, distribution and utilization of soybeans; the collection and dissemination of the best available information relating to both the practical and scientific phases of the problems of increased yields coupled with lessened costs; the safeguarding of production against diseases and insect pests; the promotion of the development of new varieties; the encouragement of the interest of federal and state governments and experiment stations; and the rendering of all possible services to the members of the Association.

EDITOR'S DESK

. . By GEO. M. STRAYER

EXPANSION IN WORLD MARKETS Total exports of soybeans for the 1959 soybean crop year ending on Sept. 30 approximated 140 million bushels. After deducting for seed usage we exported well over 25% of our total 1959 soybean crop as beans! And the exports of oil brought us to the point of export of over 40% of our entire crop, in terms of oil! And along with it were the largest soybean oil meal exports in history. It was a banner year for selling our products into the markets of the world!

Now where do we go? What lies ahead of us?

Never in my experience in the U. S. soybean industry has there been so much interest by so many people from so many countries of the world in U. S. soybeans and soybean products as exists today. Evidence of this interest was widely displayed at the meetings of the International Association of Seed Crushers in London in July. A steady stream of visitors from other countries of the world to the U. S. soybean industry in recent weeks has supplied further evidence.

To me the whole story adds up to one thing—a continued expansion of markets for our commodity in the form of oil, meal and beans in other areas of the world. We must remain competitive pricewise. We will have to continually better our quality.

As I have stated on this editorial page many times in the past—even yet we do not know how many soybeans and soybean products we can sell in the markets of the world. We had no export markets 12 years ago. Now we have sizable markets. But we have only seen the beginning! A combination of a quality product at a reasonable price when aggressively sold offers untold possibilities. Oil and protein are still the two commodities most scarce in the world food economy. In soybeans we have both.

The world lies ahead of us!

MUST QUIT MARKETING WEED SEEDS Difficult weed control in many areas of the soy belt again this year brings into focus the necessity of using every possible practical means to produce, harvest and market clean soybeans. Proper seedbed preparation, including the killing of as many weeds as possible before planting the soybeans is still to be highly desired. Some day we will have selective weed killers which will work on soybeans, but they are not yet available for general use at practical prices.

The elimination of corn from soybean fields is a relatively easy job. Corn is foreign material when harvested in soybeans, and makes them undesirable or unsalable into export markets for food usage. Recleaning will not remove it. Corn plants must be cut out or ears knocked off before soybean harvest.

Use of properly installed and adjusted recleaners on combines becomes highly important in years such as this. Weed seeds should be separated and burned or otherwise disposed of to prevent reseeding of fields.

Weed seeds are our major problem in marketing U. S. soybeans in world markets today. Constantly we receive letters here about buttonweed or Indian mallow seed, about jimson weed seed, about crotalaria seed. If we are going to continue to expand our export markets as we propose to do we must stop marketing weed seeds as a part of our crop.

SHOULD HANDLE BETTER Increasing quantities of the soybeans shipped into world markets from the United States are used for production of food products. We face a continual problem of quality in those markets.

Is it necessary to break or split as many soybeans as we do in harvesting operations? Is there not some way we could handle soybeans on the farm and in the elevator without creating so much breakage? Is it necessary to drop beans for such great distances in elevators, creating more breakage? And then to throw them against bulkheads in the cargo ships which transport them to world markets?

Should we not take a close look at our entire handling operation on soybeans? To see if there is not some more efficient and less damaging method which would at the same time be economical?

Producers of seed corn have learned to handle their product gently, to treat it with kindness—and it pays off. For the food market maybe we should take some lessons in the handling of soybeans. Maybe we need some engineering studies in this field. Just because corn, wheat, oats, barley or grain sorghum—all cereal or grass crops—are handled in one manner does not mean our product can best be handled the same way.

Soybean Research at Iowa State

A soybean test plot at one of the outlying farms of the Iowa Experiment Station.

This article was prepared by the Information Service at Iowa State University with the assistance of Charles R. Weber, professor of agronomy, Iowa State University, and research collaborator, U. S. Department of Agriculture.

FOR MORE than 60 years, Iowa State University has been actively engaged in fundamental and applied research with soybeans—today, Iowa's second most important crop.

It all began back in 1898, when Charles D. Reed, meteorologist with the weather bureau at Des Moines and in charge of field experiments at Iowa State, began making field observations of soybean plantings from seed introduced from the Orient.

Since that time, the Iowa station has introduced scores of new varieties, four of which are among today's leading soybean varieties. Hawkeye alone accounts for nearly one-fourth of the nation's soybean production.

Today, research related to soybean production and utilization has become campuswide. It embraces at least a dozen departments including agronomy, botany, plant pathology, animal nutrition (swine, beef, dairy, sheep, poultry), agricultural engineering, chemical engineering, chemistry, horticulture, entomology, agricultural economics, food processing and home economics, and veterinary medicine. Much of the soybean research work at Iowa State is conducted through cooperative agreements between the Agricultural and Home Economics Experiment Station and the U. S. Department of Agriculture. Close working arrangements are maintained with other state agricultural experiment stations throughout the country.

Much of the soybean research at the Iowa station is conducted through cooperative agreements between the Iowa Agricultural Experiment Station and the U. S. Department of Agriculture.

Thus soybean research activities have become extremely broad. Findings range from formulas for estimating hail damage on soybean fields to new product uses—including quasi-medicinal effects in bloat control in cattle.

Over the past 50 years, Iowa has become the second largest soybean producing state in the nation. In 1958, 79,458,000 bushels of soybeans were produced by Iowa farmers on 3,116,000 acres. Acreage devoted to soybeans ranked second to oats and third to Iowa's 10,065,000 acres planted to corn. The 1959 soybean acreage was slightly lower, but still 2,394,000 acres were planted.

Increase in Importance

Over the years the soybean has steadily increased in its importance as an economic crop, because of the high quality oil and excellent protein meal it produces. Soybean protein is the major protein ingredient in livestock-feeding rations. The oil is used largely in margarine, cooking and salad oils. To a lesser extent, both the oil and protein have many industrial uses.

As a result, plant breeders are taking a closer look at protein and oil characteristics of new varieties under development. At the same time they are not losing sight of other desirable characteristics such as yield, maturity dates and resistance to lodging.

Early Variety Trials

Research work with selection of soybean varieties was started in 1910 by Prof. H. D. Hughes and was continued through 1935 by Dr. F. S. Wilkins. The work of these two men largely set the stage for the development and expansion of the soybean research program in Iowa to its present high level. Through continuous work with imported oriental strains, several new seed selections were made. Among these, Mukden, introduced in 1932, was perhaps the most important and the first to receive widespread adoption.

From 1936 until 1941, the soybean breeding program was under the direction of Dr. M. G. Weiss, now in charge of crop-breeding work for the U. S. Department of Agriculture at its Beltsville station. Since 1941, under the direction of Dr. Charles R. Weber, there has been a considerable expansion in soybean improvement investigations. The study of soybean diseases under the leadership of Dr. J. M. Dunleavy has been a notable development over the past 6 or 7 years.

Developing New Varieties

Plant breeding work at the Iowa station is designed to develop those characteristics in the soybean plant which benefit both the farmer and the processor and which fit the

various soil and climatic conditions in Iowa and the surrounding states. These charcteristics include seed yield, seed size and quality, plant height, maturity date, disease resistance, lodging and shattering resistance, protein and oil content, and drying quality of the oil. Hawkeye was the first soybean variety to be developed through the hybridization method, using crosses of known varieties and experimental strains. This widely adaptable, high-yielding variety was released in 1948 and has been the leading variety in U. S. soybean production.

Adams and Blackhawk also had their origin in Iowa. Ford, a new high-yielding variety, was grown by farmers for the first time in 1959. Even vegetable soybeans have been improved by such new varieties as Kim and Kanrich. These more recent varieties were released by the station in 1956.

Approximately 80% of the soybean crop in Iowa and about 35% of the nation's production is made up of Hawkeye, Adams and Blackhawk varieties. Hawkeye alone accounted for 54% of Iowa's soybean crop and nearly 25% of the nation's total production in 1958.

But these and other well-known, good varieties such as Chippewa and Clark by no means completely satisfy the desired objectives of the plant breeders. Hundreds of new strains are continually being developed and tested that will come closer to meeting the desired characteristics.

At present, increased emphasis is being placed on protein content and disease resistance in the Iowa program. At the same time other desirable features are not being disregarded. The growing recognition of protein as a major item in food and feed, both nationally and internationally, along with the occurrence of diseases, have been responsible for this shift of emphasis in the breeding program.

Experimental strains are evaluated along with present varieties at five outlying nurseries in various parts of the state as well as at the headquarters station in Ames. Thus it is possible to check the ability of the promising new strains to fit into the various soil types and climates of Iowa. From such tests will come new varieties that will be superior to the present named varieties in one or more desirable qualities.

Plant scientists at the Iowa station currently are devoting a great deal of effort to finding and evaluating new breeding methods that will speed up the development of improved soybeans. A great deal of attention is being devoted to the separation of those characteristics of the plant that are inherited from the parent plants and those that are due to environmental conditions. Permanent gain depends on the extent to which the offspring inherits certain characteristics from the parent plants. For example, studies indicate little progress is made when selecting for seed yield with single plants. On the other hand, far more progress can be made by selecting for maturity date and plant height by working with single plants. Some desirable qualities such as seed yield are more difficult to improve than others.

Dr. Charles R. Weber, U. S. Department of Agriculture research agronomist, who directs soybean breeding research at Iowa State University, examining soybean plants in a hybridization study.

Cooperating botanists and agronomists are now measuring the usefulness of irradiation and colchicine in inheritance studies. Irradiation studies include the shooting of such energy rays as gamma rays, X-rays and thermal neutrons into both plant and seed to bring about genetic changes, called mutations, in the offspring of the plant. Colchicine, a drug, is also being applied to plants to bring about mutations. Breeders then select plants that have taken on desirable qualities through the mutation process.

Soybean Diseases

Research with soybean diseases is a major part of the soybean improvement program at Iowa State. Studies involve the nature of disease-plant relationships for each of the major diseases. Disease resistance to bacterial blight, bacterial pustule, and stem canker is receiving the most attention because of the potential danger of these diseases.

A national survey to locate and identify certain races or types of downey mildew that affect soybeans has been completed. This survey shows that one race is found more often in Iowa and other soybean producing states in the north central region. With this information, plant breeders are concentrating on the development of resistant varieties for the particular type of mildew.

Plant Structure

Botanists, under the leadership of Dr. J. E. Sass, are studying the structural makeup of the soybean plant. Both the dormant or nondeveloping embryo and nondormant or developing embryo are examined microscopically in various stages of development—from seedling germination to flowering time. The mapping of developing cells into the various structures of the plant will be helpful to pathologists, nutritionists and breeders in their special areas of soybean studies.

Hail Damage

Hail damage to crops in Iowa is a major source of loss to farmers each year. Iowa farmers pay about $12 million annually for hail insurance. For the past 15 years, a research project at the Iowa station has been aimed toward an evaluation of hail damage to soybeans at various stages of growth. Effects on yield with varying amounts of defoliation, stand reduction, topping, stem

breaking and bruising of plants have been studied intensively.

These studies have provided valuable information to both farmers and hail adjusters in arriving at a more equitable settlement in case of hail damage. And whether the grower has insurance or not it has enabled him to determine his ultimate loss with reasonable accuracy and has provided guideposts as to whether he should replant his hailed field. These studies have also proved helpful in evaluating losses due to insect and disease injury.

Weed Control

Still another team of researchers at the Iowa station are studying the effect of weeds on soybean yields together with the most appropriate methods of weed control. This team is composed of botanists, agronomists and agricultural engineers and is under the leadership of Dr. D. W. Staniforth. Studies include various cultural practices involving seedbed preparation and cultivation together with the application of certain herbicides before and after emergence.

From these studies, it is hoped that the most practical and economical combination of cultural practices and herbicides to control weeds in rowed and solid-drilled soybeans can be found. Considerable progress has been achieved.

Nodulation Study

In nodulation study, two genetic identical soybean strains have been developed except that one strain will form nodules and the other strain will not. Various rates of nitrogen are applied to the soil in which these strains are grown so that an evaluation of nitrogen utilization by the plants can be made. The degree of response is checked in terms of nitrogen formation in relation to seed yield and size, protein and oil content, and amount of dry matter produced in the different years and on different soils.

The nodulating, non-nodulating characteristic may serve as a tool to determine why legumes form nodules and non-legumes do not. Such studies may also prove valuable in determining the effects of various levels of water and nitrogen availability to plant yields.

Formation of Products

Soybean yields, and the oil and protein content of the seed result from the action of light on green and yellow pigments in soybean leaves. Relatively simple compounds are made into complex food materials. How this intricate process takes place in the formation of substance, how they move from one part of the plant to another and how they are utilized in the formation of the end plant product are basic studies currently being made by Dr. Sam Aronoff and Dr. Irving Anderson.

Fertilization

Investigators in soybean fertilization are faced with the major problems of determining the nutrient needs of the soybean plant. There is a serious lack of basic information on the nutrient requirements and utilization in soybean plants. Researchers do know that soybeans, in general, are not as responsive to fertilizers as corn. The departments of agronomy and botany are conducting experiments to find out why this is so. Studies are directed by Dr. J. T. Pesek.

Experiments are under way to get more information on the nutrient uptake by the plant in respect to the amount of available potassium and phosphorus in the soil along with the resulting yield. This is done by analyzing parts of soybean plants, at various stages of growth, for the presence of nutrients. Yield is also measured using mature plants. Different combinations of potassium and phosphorus are applied to the soil in testing areas. Through this process better recommendations for nutrient applications can be made.

Other projects are under way on soybean fertilization designed to derive information regarding the response of present soybean varieties to various fertilizers on typical Iowa soil types. Through such efforts, more effective fertilization programs can be recommended to Iowa farmers. The effects on soybean yields of time, rate, and method of fertilizer and manure application also are being tested. Other procedures include the effects of soil compaction, aeration, and moisture level on the growth and yield of soybeans.

Rotations

Since 1948 continuous tests of soybean yields in different types of crop rotations have been made. Dr. W. D. Shrader is directing tests to measure the effects of soybeans on corn, sorghum, and oats, in different types of rotation systems. The effects of soybeans on soil properties also are being studied. Supplemental irrigation on commonly grown soybean varieties is being used on highly productive soil to determine the effect on such factors as yield, flowering, and lodging.

Animal Nutrition

Properly processed soybean oil meal is universally accepted as the most important single source of protein for use in livestock and poultry feeds.

Soybean meal has occupied an increasingly important role in balanced rations during the past 18 years. About 60% of the protein—both animal and vegetable—available in all high protein feed supplements is supplied by soybean oil meal. This is mainly due to an increase in nutrition research which has shown that rations balanced with soybean proteins are the most economical.

But some nutritional deficiencies exist in corn-soybean rations. One phase of research in animal nutrition at the Iowa station is aimed at determining what these deficiencies are and then attempting to find effective and economical ways of correcting them.

Swine Feeding

In the swine nutrition program, for a number of years headed by Dr. Damon V. Catron, primary emphasis is being placed on determining the nutritional requirements of baby pigs. The development of "I.S.C. 75," a dry pig-starter ration, permitting the successful weaning of baby pigs as early as 7 days of age, has paved the way for further study of feed requirements for baby pigs.

Recent studies show that soybean oil meal supplies an excellent source of protein for pigs that are 5 or 6 weeks of age or older. However, pigs weaned at 1 or 2 weeks of age do very poorly on soybean protein until they reach this age.

Nutritionists concentrated on this problem. They found that pigs under 5 weeks of age lack the necessary digestive enzymes to break down plant starches and proteins into digestible forms. Noticeable gains were found with pigs of the same age when fed these enzymes with soybean oil meal separately or with corn.

Poultry Feeding

Soybean oil meal is the leading supplementary protein concentrate used in poultry rations throughout the United States.

Nutritionists in many countries believe that U. S. soybean meals for farm animals are superior to soybean meals found in other countries. Through suggestions and cooperation of the Soybean Council of America, a research test was under-

taken at the Iowa station to determine if there was justification for these beliefs. Because of a limited supply of foreign feed for the tests, poultry were used.

Dr. S. L. Balloun directed the research designed to compare a blended U. S. soybean meal containing 50% protein to a Russian soybean meal containing 45% protein. Each of the two soybean meals was fed to a given number of battery-reared, female, broiler-type chicks which were fed from 4 days of age to 4 weeks of age. Two simple corn-soybean meal type diets were fed to the chicks. One diet contained 20% protein, and the second contained 16% protein.

Results *do* show a greater improvement in *gains* during the experimental period with the chicks fed the U. S. soybean meal diet than with the chicks fed the Russian soybean meal diet. The chicks fed the U. S. soybean meal containing 20% protein gained 9.3% more than the chicks fed the Russian meal containing 20% protein. The chicks fed the U. S. soybean meal containing 16% protein gained 7% more than the chicks fed the Russian soybean meal containing 16% protein.

Bloat Research

Bloat is still common among cattle and sheep. Although management practices help check bloat, no dependable control of bloat exists.

Recent work in the United States and New Zealand shows that certain oils, particularly peanut oil, are effective in reducing bloat, presumably by reducing the amount of foam in the rumen. In recent tests at the Iowa station, soybean oil and other forms of soybeans are being studied as possible means of controlling bloat.

During the 1958 pasture season under the direction of Dr. N. L. Jacobson, a number of beef and dairy cattle were used in experiments designed to evaluate measures for prevention and control of bloat. Before grazing on alfalfa pasture, known to cause bloat, the animals received grain mixed with a bloat preventive or grain alone at the rate of 1½ pounds of total mixture per animal. Various forms of soybeans were some of the products used.

Results show that feeding ¼ pound of soybean oil in 1¼ pound of grain per animal prevented bloat for 3 to 4 hours when soybean oil was fed in the grain immediately before grazing. One-half pound soybean oil fed in 1 pound of grain made the mixture less palatable and reduced consumption with some animals, making evaluation difficult.

Feeding soybean oil with ground corn cobs and grains was less effective in controlling bloat than feeding a mixture of soybean oil and grain alone. Feeding ground-raw or flaked-raw soybeans had little effect on controlling bloat.

During the last 2 years, research was done in an attempt to control bloat in drylot feeding. Studies show that by sprinkling crude soybean oil on soilage at the rate of ¼ pound per daily allowance of soilage fed to a 1,000 pound animal, bloat can be controlled effectively.

Other Research

Other research work with soybeans is being carried on in the areas of agricultural economics and chemical and agricultural engineering.

The department of agricultural economics is analyzing the methods, practices, and costs of storing and marketing soybeans and soybean products.

ISU chemical engineers have been making some comparative studies of various petroleum solvents with hexane which is the standard for extracting oil from the soybean. Hexane does a very satisfactory job of extraction and the quality of the oil is high, at least down to 1% residual oil in the meal. Beyond that point the amount of refined oil that will be secured from a given batch of beans begins to decline.

Proper handling of soybean seed is a problem on many farms. Agricultural engineers are conducting work designed to evaluate methods of drying and storing soybeans. Particular emphasis is being placed on testing mechanical ventilation methods to insure better handling and storage conditions for soybeans on Iowa farms.

Problem Basis

Much of the soybean research under way in various areas of the Iowa station is on a *continuing* and *cooperative* basis. Not only is there cooperation among and within departments but also there is cooperation with various agencies of the federal government. This attack on soybean problems through such a cooperative problem basis will hasten the development and utilization of economical and high quality protein and oil of soybeans.

Ask Canadian Tariff on Soybeans, Soy Products

THE ONTARIO Federation of Agriculture recently submitted a brief to the Canadian government calling for tariffs of 45¢ per bushel on imported soybeans, 5¢ per pound on vegetable oil, and $6 per ton on soybean meal, according to the U. S. Department of Agriculture.

Soybeans and soybean cake and meal now enter Canada duty-free. Soybean oil, when imported for specified nonfood uses and for fish canning, enters duty-free. When imported for other uses "not otherwise provided for" specific ad valorem rates apply. They are 15% (preferential); 20% (most favored nation); and 25% (general).

The Canadians contend, according to the brief, that domestic prices of soybeans are depressed because of duty-free imports of U.S. soybeans.

The Federation has calculated that the proposed tariff structure would increase the price to producers of Canadian soybeans to about $2.30 per bushel from the present $1.90. This in turn would lead to diversion of acreage in southwestern Ontario from the present production of oats and mixed grain—now surplus products—to soybeans, thereby making Canada self-sufficient in soybeans.

Ontario soybean growers maintain, according to the Federation, that were it not for competition from below the border, production in Ontario could expand to meet domestic requirements. It is estimated that self-sufficiency in soybean products would require an additional 370,000 acres in soybeans. (This year 256,500 acres were planted to soybeans.)

Soybean Prices Are Higher in Brazil

WITH SOYBEAN crushing mills in Rio Grande do Sul, Brazil, absorbing all soybeans available in the local market, prices increased for the fourth consecutive month and in early September were quoted at $2.06 per bushel compared with $1.83 a month earlier, according to Foreign Agricultural Service, U. S. Department of Agriculture.

With only small quantities of soybeans expected to go into international markets, an adequate supply for the national processing industry seems assured. Many growers plan to increase acreage for the next crop.

THE NEWS IN BRIEF

THE CROP, MARKETS AND OTHER ITEMS OF NOTE

World Crop Is Larger

World production of soybeans in 1960 is estimated at 983 million bushels, **up 3% from last year,** but 2% below the 1958 record of 1 billion bushels, according to the U. S. Department of Agriculture.

Production is sharply up in Brazil, being estimated at 8 million bushels, or 40% above 1959. The crop is larger than 1959 in the United States (see page 26) and the Soviet Union, and down somewhat in Canada and Japan. Canada's crop, estimated at 6.3 million bushels, reflects an 8% decline from last year's record, due to lower yields. Japan's production is estimated at 14.5 million bushels, about 7% smaller than last year due to a decline in acreage. Soybean production in the Soviet Union is believed to be a little above the 8.2 million bushels harvested from 1.1 million acres in 1959.

The crop is estimated at about 350 million bushels, the same as last year in Mainland China. But we have unofficial reports that **China's 1960 harvests may be cut sharply due to both drought and floods.**

Close Balance Of Meals

Greater numbers of livestock and poultry during the next 12 months will have an abundant supply of feed grains, and a **close balance of high protein feeds,** according to the feed survey committee of the American Feed Manufacturers Association. Twenty-four college and experiment station men, comprising the committee, represent all areas of the United States and include economists, personnel from dairy, poultry and animal husbandry departments, as well as several deans of colleges and directors of experiment stations.

The 1961 pig crop will be 10% larger than the 1960 pig crop, according to the committee. Beef cattle numbers are expected to be up 4% during 1961. Increases of 7% are anticipated in both turkeys and broilers. Numbers of layers may be down 4%. Relatively little change is expected in dairy production and in sheep and lambs.

The calculated feed balance for the year ahead indicates high protein feed use to be within 1% of estimated supplies, and an excess of grain supplies by more than 50%. It's anticipated that a total of 131 million tons of feed will be used.

Soybean production for 1960 is estimated to be 4% above last year. The cottonseed crop is as large as that for 1959. **Supplies of meal from the major oilseed crops available for feed are about 3% larger than the amount fed last year.**

Outlook for Exports of Edible Oils

Continued strong foreign demand for soybeans is **expected to result in another record export year,** according to Foreign Agricultural Service. Soybean exports of 23 million bushels in July-August 1960 were one-third larger than the 15-million-bushel total shipped in the same period a year ago. The continuing strong foreign demand reflects primarily the increased consumption in Japan and the increased crushing in Northern Europe for oil and meal. Shipments for fiscal year 1961 ending next June 30 are expected to exceed last year's 133 million bushels. (See Washington Digest on page 34 for more detailed earlier report.)

Canada's exports of soybean oil and soybean meal in the marketing year Oct. 1, 1959 to Aug. 31, 1960, were 20% and 44% respectively above the same period last year, says FAS.

Northern Harvest Near End

Harvest was about finished in North Central States as the Soybean Digest went to press. Some early beans had been harvested in the South and on the East Coast, but the main movement was still to come in most southern areas. Paul C. Hughes, Farmers Soybean Corp., Blytheville, Ark., reported the crop 45% harvested in the Blytheville area as of Oct. 27.

Soybean harvesting was approaching completion in all but two northern-most districts in Illinois, and in the latter was more than four-fifths done. Most unharvested beans in Indiana were planted late or were too weedy to combine before frost.

Harvest also moved along rapidly in late October in Iowa, Minnesota, and the Dakotas. Some Minnesota localities finished combining ahead of every year since 1956.

Reports About Pests

Stinkbug infestations have been reported in many parts of the South this year. George Spain, extension agronomist, Raleigh, says some damage is being reported in that state. Early beans were damaged by stinkbug in Virginia. And Harold Lumsden, Essex Grain Co., Essex, Mo., wrote less than the usual volume of soybeans was going into storage in southeast Missouri because of the possibility of increase in emphasis on stinkbug damage.

But Gordon Barnes, extension entomologist, University of Arkansas, says **it is very difficult to recognize stinkbug damage** and that some damage due to other causes has been attributed to stinkbugs. (See report on page 35.)

Market Development Conference

A market development conference was called by Foreign Agricultural Service at Munich at the time of the IKOFA Fair in early October to help formulate trade fair activities in 1961.

Soybean Council of America representatives included Fred R. Marti, director of foreign operations, Jose Muentefering, assistant to the director, J. W. Hayward, director of nutrition, and A. D. Donnell of Waterloo, Iowa. Dr. Hayward and Mrs. Donnell were in charge of the U. S. soybean exhibit for the Council at the IKOFA Fair.

The Council has made commitments to participate in a number of trade fairs abroad in 1961. (See report on page 23).

Export Shipments Were Up

Shipments of edible oils in August, at 229.6 million pounds, comprised the largest single month's volume of the year, according to Foreign Agricultural Service, USDA. The **cumulative 11-month record of 1.4 billion pounds exceeded the previous 12-month record of 1958-59 by 6%.** Almost one-half of the October-August exports moved out under P. L. 480. About 99.2 million pounds of soybean oil (over half of the total soybean oil exported in August) went to Spain.

The October-August total of soybean cake and meal exported was 604,500 short tons, well above the 515,200 short tons marketed in the entire previous marketing year.

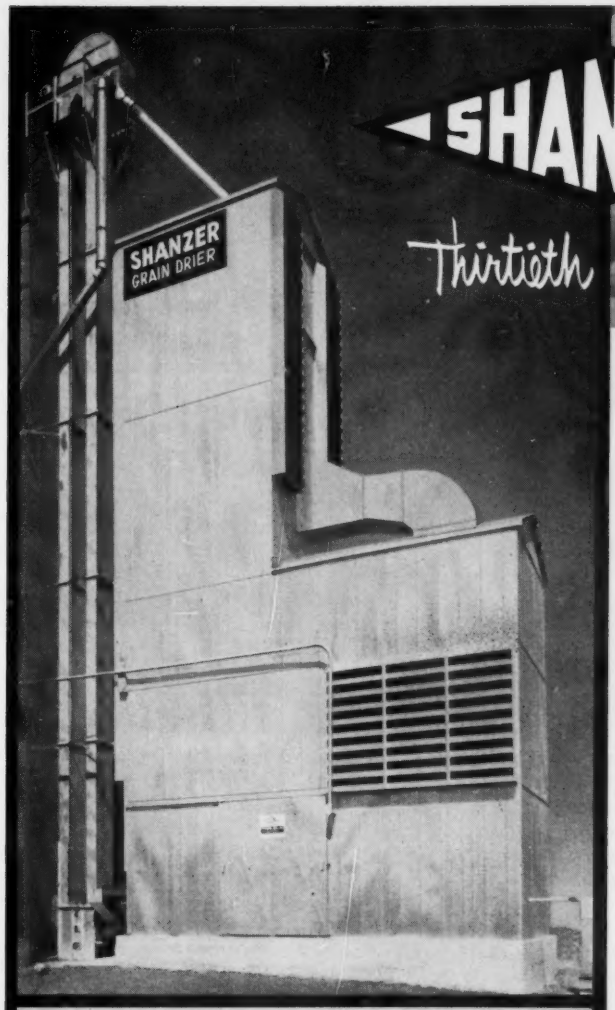
Edible oil export business announced by USDA during October:

A further amendment of a vegetable oil purchase authorization under P. L. 480 to Iceland to extend terminal contracting and delivery dates to Nov. 30 and Dec. 31 respectively for $100,000 worth or about 370 metric tons of U. S. cottonseed oil or soybean oil. So far 150 tons have been purchased.

Issuance of an authorization to Korea to finance purchase of up to $750,000 worth of cottonseed oil or soybean oil, about 2,700 metric tons, under P. L. 480. Contract period is from Oct. 19 through May 31, with delivery period through next June 30.

Issuance of an authorization to India to buy up to $1 million worth of soybean oil, about 8.8 million pounds, under P. L. 480. This is the full amount of the agreement announced Sept. 23. Contract period is from Oct. 26 through Aug. 31, 1961, with delivery period through Sept. 31, 1961.

A supplemental agreement entered into with Iran for financing sale of $1.2 million worth of cottonseed oil or soybean oil—about 8.8 million pounds—for rials (Iranian currency). The agreement further supplements one dated July 26, 1960.



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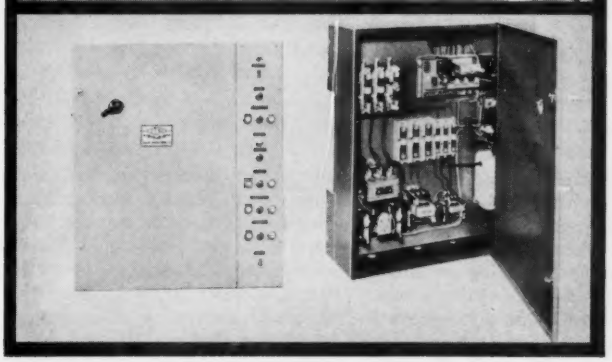

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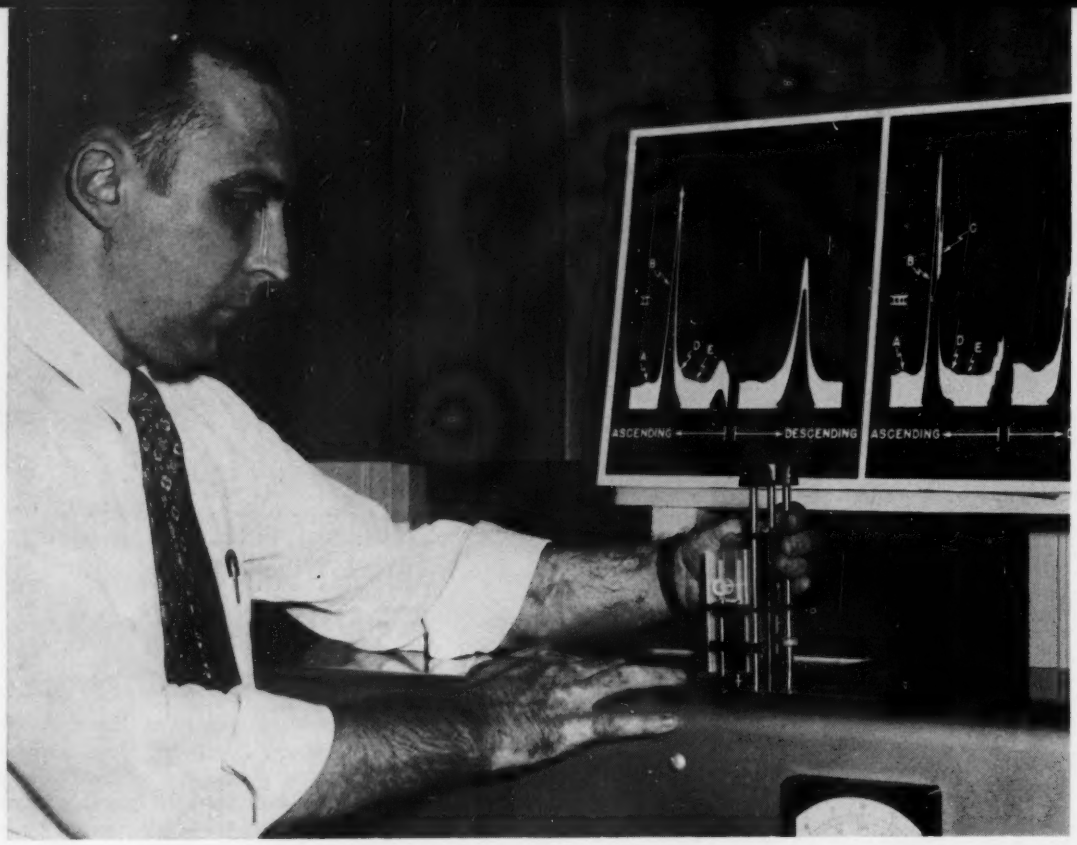


DR. J. J. RACKIS used electrophoresis in research to determine the protein components of soybean meal.

Progress in Soybean Protein Utilization

By JOSEPH J. RACKIS and J. C. COWAN

Northern Regional Research Laboratory*
Peoria, Ill.

INCREASING use of soybeans has come and will continue to come from a combination of factors: A worldwide shortage of protein on the one hand and a plentiful supply of high-quality, low-cost soybean protein on the other. Miracle! Magic! Such terms have been used to describe the phenomenal increase of soybeans as a cash crop and the extensive use of soy protein in feeds and foods.

Soybeans as a cash crop increased from 192 million bushels in 1944 to 580 million in 1958 on land which previously contributed to production of surplus crops. Out of a total supply of 16.7 million tons of high-protein feed in the 1958-1959 crop year, an estimated 9 million tons came from soybeans (1). Man has improved feed efficiencies equally as much with increased knowledge of animal nutrition and with incorporation of soybean meal as part of the animal ration. Pounds of feed required to produce a dozen eggs or a pound of live weight decreased in the 27 years after 1930 as follows:

Year	Eggs	Broiler	Turkey	Pork
1930	7.3	5.0	6.5	3.9
1957	5.6	2.4	3.6	3.1

Soy protein, like animal protein, provides an efficient balance of essential amino acids in food. If sufficient soy protein were available for proper distribution, it could be a key factor in alleviating protein deficiency diseases in the world. Most other readily available proteins from vegetable sources have a lower biological value, and domestic sources for producing isolated protein are very limited. Nearly all industrial casein is imported. Industrial animal proteins are derived from residues at packing houses and are in limited supply. There is no commercial production of isolated peanut and cottonseed protein. The main sources of isolated protein are corn and wheat gluten, fish meal, and soybean meal.

The recent dedication of a new plant that has a capacity to isolate 5 million pounds annually of edible soybean protein (2) indicates that present uses will expand. A review of the more important research and technological developments that

* This is a laboratory of the Northern Utilization Research and Development Division, Agricultural Research Service, U. S. Department of Agriculture.

This is one of three articles on the uses of soybean products. The others, on the uses of soybean oil and soybean meal, appeared in our June and July issues.

have contributed to increasing use of soybean meal and isolated protein in foods, feeds, and industrial products appears timely. Future prospects will also be considered.

Soybean Oil Meal

In 1929, 1.6 million bushels of soybeans from a total production of 9.4 million bushels were processed for oil and meal. Today, nearly 400 million bushels of soybeans are processed in the United States. The first soybean oil meal produced from American-grown soybeans was made by the screw-press process in 1915. Solvent extraction was introduced in 1934, but the screw press remained the major process until about 1950. Now, practically all U. S. soybeans are processed by solvent extraction.

Soybean oil meal is defined by the trading rules of the National Soybean Processors Association as: "The ground residue after removal of the oil by pressure or extraction from soybeans. The name descriptive of the process of manufacture such as screw-press (Expeller) or solvent-extraction shall be used as part of the brand name. It shall be designated and sold according to its protein content."

Compositions of the two most important soybean oil meals are:

	Soybean oil meal[1]	
	44%	50%
Protein, % minimum	44.0	50.0
Fat, % minimum	0.5	0.5
Fiber, % maximum	7.0	3.0
Nitrogen-free extract, % minimum	27.0	27.0
Moisture, % maximum	12.0	12.0

[1] When shipped by seller.

Of the crude fiber in 44% soybean oil meal, about one-half comes from the hull and one-half from the cotyledon. In 50% soybean oil meal most of the hulls are removed during processing. Presently, more than 60% of the meal produced in the United States is 50% meal.

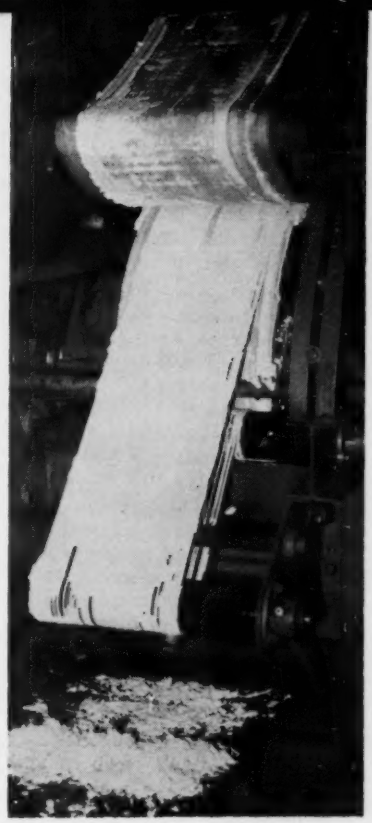
The terminology, soybean oil meal and soybean meal, are used interchangeably in this review. The term isolated soybean protein (or protein isolate) is restricted in meaning to a protein isolated chemically; analysis of the protein isolate, after correction for ash and moisture, shows that it is nearly 100% protein. Other products can be isolated from soybean meal by chemical means that contain 70% to 80% protein. Such products are referred to as soybean protein concentrates; one containing about 75% protein is now commercially available. Although it is true that soybean oil meal is valued for its high protein content and that practically all uses of meal are based on its protein, it is not scientifically correct to refer to soybean meal, isolated soybean protein, and soybean protein concentrates simply as soybean protein. Properties and end uses of these products vary considerably because of their widely different protein content. Nearly 94% of the 9.5 million tons of soybean oil meal produced in the crop year 1958-59 went for livestock and poultry feeding; of the percentage remaining about 5% was exported, and the rest was used industrially (3).

Soybean oil meal was first used industrially in 1927 as a plywood glue. In a 1951 survey, 51.5 million pounds of meal were produced for such industrial uses (4) as glues, sizing, plywood adhesives, wallpaper coatings, asphalt emulsions, and special formulations for paper. Plywood alone accounted for 42 million pounds (4). Since that time no comprehensive survey has been published.

Present annual production of industrial meal is probably 200-250 million pounds of which over 100 million is used in plywood glues. Soybean meal is still the "number-one" plywood adhesive. The meal is subject to deterioration by microorganisms and environmental conditions and has not been perfected as an adhesive in exterior-grade or waterproof plywood. (Certain synthetic resins are needed in these applications.) An additional 15-20 million pounds of meal could be used in asphalt emulsions alone if deterioration could be prevented.

Soy Flour

Soy flour and soybean oil meal are comparable in protein content and have many uses in common. However, methods of manufacture and some end uses differ considerably. Also, production figures for soy flour and soybean meal are published separately by USDA's Agricultural Marketing Service and in trade publications such as the Soybean Blue Book. Consequently soy flour and soybean oil meal are discussed separately; however, the



VACUUM FILTER with a string discharge used for pilot production of isolated soybean protein in research at Peoria Laboratory.

technological advances that have been responsible for the great progress in the industry apply to both flour and meal.

The continuous solvent-extraction method was the first major step toward perfecting soy flour and soybean oil meal. This process, developed in Germany, was introduced into the United States in 1934, and made possible a defatted soy flour containing less than 1% of fat. A partially denatured meal that has a nitrogen solubility index of 85% to 90% is easily attained with precise heat control. In 1951, vapor-phase desolventizers (5) and later "flash-type" desolventizers were further process improvements (6). A recent improvement, widely adapted for meal, has been the desolventizer-toaster (7). Scientific tempering of the natural beany and bitter flavor has also contributed particularly to the preparation of quality soy flour. This modern product can be combined with many types of foods without basically altering their natural characteristics. These developments greatly increased the use of soy flour in baking and other food industries.

Soy flour can be added to bread to an extent of about 5% (and isolated protein to about 10%) with-

out materially affecting baking characteristics. This incorporation makes the combined proteins in bread more nutritious and more nearly comparable in quality to the proteins in meat and milk. Soy flour, because of its low cost, is a "natural" for institutions as a supplement to meat and cereal products. New York state institutions, for example, allow a daily ration of 0.03 pounds of soy flour per person per day. If all public institutions were to use this level, a market potential of 77 million pounds annually would be realized (8). Probably this market will expand gradually.

Soy flour and grits are used in pet foods and prepared mixes, in meat, cereal, and baked products, and in antibiotic fermentation media. There is a large volume of literature pertaining to the use of soybean milk made from the flour as a food for infants allergic to cow's milk and as a substitute for human and cow's milk. Some foreign countries have built plants to make soybean milk.

Total production of flour and grits was 225 million pounds for the 1957-1958 crop year (9). These figures do not include the soybean meal used in plywood glues and other industrial uses or that used to produce food-grade and industrial-grade isolated protein. Soy flour is used primarily in foods.

Multi-Purpose Food,** a dietary protein concentrate, will be manufactured and marketed soon for use in the United States as well as abroad (10). It is a soybean product, 2 ounces of which will provide one-third the daily dietary allowance for proteins, vitamins A and D, thiamine, riboflavin, niacin, iron, calcium, phosphorus, and iodine. Multi-Purpose Food is the widely publicised "3¢ meal" that has been introduced into more than 100 countries.

Gelsoy (11), a specialty soybean meal product developed by the Northern Regional Research Laboratory, has been incorporated successfully into hot dogs, meat loaf, and canned meats. It forms irreversible gels and has special adhesive properties as a heat-sealing glue. Industrial interest has recently been renewed in Gelsoy, but there is yet no commercial production.

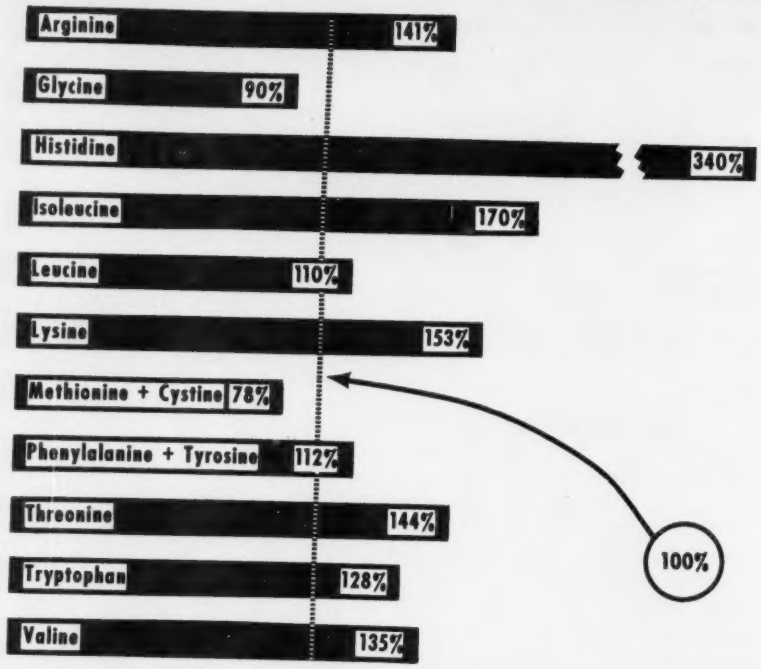
Isolated Protein

Soybean oil meal having a high nitrogen solubility index gives industrial-grade and food-grade protein isolates. The isolation procedure probably causes denaturation, which is defined as a nonproteolytic modification of the unique structure of native or natural protein that causes definite changes in chemical, physical, and biological properties. Isolated proteins that have been subjected to a minimum of heat and chemical treatment and that have been processed under sanitary conditions are designated as edible or food-grade proteins. Proteins that have been modified extensively and that have lost their nutritional value are inedible or industrial-grade proteins.

An edible grade of isolated soybean protein is a bland product and, because of its higher protein content and purity, does not have the restrictions of soy flour in food applications. As a result, demands for protein enrichment of foods, industrial uses, and other potential applications will probably encourage a larger production of isolated protein. The endless uses for this "multipurpose quality protein" have already been described (12). Detailed information on all phases of processed plant proteins, methods used for producing meal and protein, and uses of these products has been compiled by Altschul (13).

Production of industrial-grade isolated soybean protein for the paper industry was started in 1935. The demand for soybean protein isolates in food is a recent development; their production was not started until 1949. According to a 1951 survey (4), isolated protein is used in pigment coating of paper, wallpaper coating, water and latex paints, lamination of fiberboard, fire-foam liquids, inks, leather finishing, felt-base floor coverings, shotgun shell casings, emulsions, sizings, adhesive formulations, insecticide preparations, and, of course, edible protein. Total annual production of industrial protein was 27 million pounds with pigment-coatings accounting for about 14 million pounds (4). Current production is probably around 60 million pounds for industrial protein. Food-grade figures are unavailable. Many producers have recognized that strong markets exist, and

SOM Fills Chicks' Needs for Nine Essential Amino Acids



Soybean oil meal, in the quantity consumed by a chick on a 20% protein ration, supplies more of nine essential amino acids or amino-acid combinations than the chick actually needs. The percentage of the chick's requirement for each amino acid that is supplied by soybean meal is shown in the bar chart. Of 11 amino acids essential to chicks, the soybean meal in a 20% ration is deficient in methionine and phenylalanine; but they may be partially replaced as the chart shows. Information on the amino-acid content of soybean oil meal fractions is available for the first time as a result of research at Northern Utilization Research and Development Division, Peoria, Ill. The above chart is an example of how the new information may be applied. No feeding tests were run in the Peoria research; information on a chick's amino-acid requirements came from the literature.

** The use of trade names should not be construed as an endorsement of these products by the U. S. Department of Agriculture or of the manufacturers thereof.

they expect their future production will be much higher. In fact, a market for 1 billion pounds of edible protein by 1975 has been forecast by some soybean processors.

Industrial development of regenerated protein fibers covers a period of about 65 years. Vandura silk, a gelatin fiber, was introduced in 1894. Experimental fibers were made from collagen, cottonseed protein, egg whites, and chicken feathers. At one time textile fibers offered the greatest potential for vegetable proteins. Commercial production of Aralac from casein was started in 1937 in the United States. Fibers from soybean protein were in production for a brief period in 1943. Large amounts of Ardil, a peanut protein fiber, and of Vicara from zein (based in part on work done at the Northern Laboratory) have been produced since about 1946. Today, there is no commercial production of regenerated protein fibers, due largely to the development of versatile synthetics that have wool or silk-like properties.

Need for Research

To improve or expand the end uses of soybean protein and meal more basic research is needed on isolated proteins and on other constituents in soybean meal and their effect on protein properties (14). No one really knows what the detailed structure of a protein is, nor have many vegetable proteins been isolated in a high state of purity.

Proteins are extremely complex polymers that contain 18 to 20 amino acids in the form of peptide chains that have a large number of different side groups. Depending on the location of these side groups and the amino acid sequence, proteins can form complex structures that differ greatly in size and shape. Soybean proteins like many native proteins are extremely sensitive to heat, salt, acid, urea, irradiation, and other agents. Their ability to react with other proteins, carbohydrates, fats, and many low molecular weight substances can be very pronounced. For these reasons, film-forming, gelling, moisture-binding, sizing, and adhesive properties of soybean proteins can be modified drastically by even minor modifications of their complex structures. Soybean protein can also stabilize emulsions and facilitate mixing of components which otherwise would be incompatible.

Toasting is required to convert the low nutritional quality of soybean protein of raw meal into one that has a biological value nearly comparable to the proteins of meat and milk. After 30 years of investigation, considerable uncertainty still exists concerning the nature of the growth-depressing action of raw meal. Additional knowledge regarding this action might permit improvements in present processing methods or tests to give and determine maximum nutritional value of raw meal.

Unavailability of amino acids in the protein of raw meal and the presence of heat-labile proteins and other constituents having adverse physiological activity are the two hypotheses frequently used to explain growth inhibition in test animals fed raw soybean oil meal. These anti-nutritional factors are sometimes referred to as toxic substances. This term is a misnomer because feeding larger amounts of raw soybean meal in the ration overcomes nearly all its growth-inhibiting properties.

Industrial soybean protein is subjected to severe physical and chemical treatment and was never intended to be used in nutritional studies. Nevertheless, some investigators have used this protein as a measure of the biological value of the soybean. Industrial soybean protein could be expected to inhibit growth and impair other physiological processes. Later experiments, using properly treated whole soybeans, soybean meal, and isolated protein, show that the proteins have a high biological value which compares very favorably with meat, fish, and milk proteins, particularly when supplemented with small amounts of methionine.

Soybean meal and isolated protein are used as a standard in many basal diets to test the nutritive value of various feed additives and to determine the nutritive value of proteins from other vegetable sources. Small differences exist between different samples of commercial soybean oil meals and isolated edible proteins. These differences can become highly significant in experiments using refined basal test rations. There is a need, therefore, to standardize the preparations of soybean meal and isolated protein and to make them readily available for nutritional research. These standardized products would permit a more orderly use of isolated soybean protein or soybean meal in nutritional studies and would help avoid indiscriminate use of soybean products.

The Future

A market for 16 million tons of soybean oil meal in formulated feeds and other feed uses and a total production of 870 million bushels of soybeans for feed, export, and seed are predicted by 1975 (15). These estimates apparently do not include soy flour and isolated protein. Many processors recognize volume markets exist, and they expect future production of isolated protein to expand greatly. A market for 1 billion pounds of edible protein by 1975 has been forecast. With an increased public knowledge of nutrition, it is only natural that soybean meal, flour, and isolated protein will be logical choices as ingredients of high-protein packaged foods of the future. The market potential for public institutional use of soy flour (8) and for its increased industrial use are additional factors in the 1975 forecast. One can visualize a billion-bushel crop of soybeans by 1975!

These predictions presuppose that other sources of protein will be limited and that byproduct soybean oil can be readily disposed of through international trade channels and through research to increase domestic industrial utilization (16). It appears that research on oil and meal may be one key to making the predictions come true. Industrial and food products of superior quality will be needed to meet competition from other sources as well as to create new markets.

The soybean, first planted as a forage and fertilizer crop, is now a major crop in U. S. agriculture. Not only that, it created a large new industry within 30 to 40 years. With ever-increasing amounts of oil and meal products going into foods, feed, and industrial products, soybeans are truly "gold from the soil."

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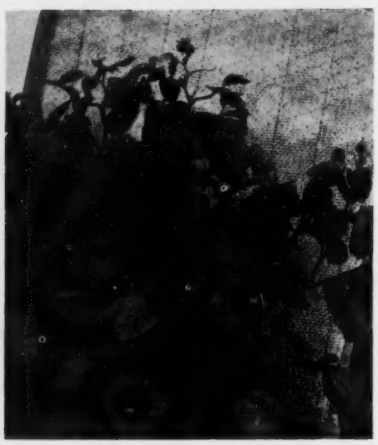
Study of Bud Blight



SOYBEAN PLANTS inoculated with bud blight (right) are compared with non-inoculated plants in Iowa State Experiment Station test plots at Cresco, Iowa. Plants infected with bud blight had few or no pods in mid-September. The infected plants stayed green until frost without setting pods, while non-infected plants showed a good pod set. Top photo shows a row of a resistant strain, with little difference between inoculated and non-inoculated plants. Disease men are running through the whole germ plasm bank of the U. S. Department of Agriculture and cooperating state experiment stations in a search for strains resistant to bud blight. Nurseries where the work is being conducted are also at Fargo, Urbana, Lafayette, Columbia, and Raleigh. John M. Dunleavy is in charge of the work at Cresco and at Fargo.

THE VIRUS causing the destructive bud blight disease of soybeans is seed-transmitted in nature, cooperative State-USDA research shows.

Studies at the Indiana Agricultural Experiment Station, Lafayette, gave the first proof of seed transmission in naturally infected soybeans of this virus (TRSV), which also causes ringspot disease in tobacco.

Little has been known of the developmental history of this virus in soybeans. It is a relatively new disease, first reported as causing severe losses in 1943. The virus infects soybeans systemically, and may kill the growing point and terminal bud in young plants, retard pod development, or make plants dwarf or barren.

The disease occurs intermittently and seems to be most prevalent in fields near legume-grass mixtures or uncultivated grassy areas. Because of its sporadic appearance but rapid spread in infected fields, an insect vector is suspected, although none has yet been identified. But part of the story of the virus has been uncovered in experiments by pathologists K. L. Athow of Agricultural Research Service and J. D. Bancroft of the State Station.

Soybeans naturally infected in test plots were tagged on the date when symptoms first showed. Earliest symptoms appeared when the plants were 38 days of age, about 18 days before flowering and fertilization begin. Forty-one percent of these plants produced no seed. But 78% of the remainder transmitted the virus to a total of 91% of their seeds, as evidenced in plants grown from these seeds. The closer to date of flowering that symptoms appeared, the fewer plants gave seed transmission, and the fewer the infected seeds on these plants. This conforms to the theory that a systemic virus must enter the sex cells before fertilization in order to be seed-transmitted.

Moreover, plants grown from infected seed passed the virus on to a large percentage of their progeny.

Athow and Bancroft located the virus within the embryo of the seeds. Some systemic viruses are carried on the seedcoat when seedborne. TRSV in soybeans, however, was transmissible to cowpea, another host plant, with extracts from embryos, but not with extracts from seedcoats. And soaking seeds in sodium phosphate solution, a chemical which inactivates the virus in extracted sap, did not reduce the infectivity of the seeds. The virus remained infective in seed stored for 9 months under ordinary storage conditions.

No evidence of soil transmission of the virus was found in the studies.

Less Phytophthora Damage

THERE APPEARS to have been less damage from phytophthora in Illinois this year than last in spite of cool wet conditions that prevailed at seeding time, according to the Illinois Crop Improvement Association.

Analyze Meal Byproducts for Amino Acids

FOUR SOYBEAN meal byproducts, production of which totals at least 450,000 tons annually, have been analyzed for amino-acid composition of their proteins for the first time.

J. J. Rackis

A U. S. Department of Agriculture chemist reported the research at the American Chemical Society meeting.

Amino acid compositions of proteins in the soybean hull or seedcoat, residue, whey, and hypocotyl or germ thus become available to nutritionists and feed and food manufacturers. Nearly 9 million of a total 16.7 million tons of high-protein meal used in livestock feed in the 1958-59 crop year came from soybeans, and use of soybean protein in food is increasing. The feed and food industries need complete information on amino acid compositions. Using the present knowledge of the amino acids in soybean meal and corn, for example, livestock nutritionists formulate feeds complete in amino acids essential to swine and poultry.

Amino acids are the "building blocks" of protein. Eight of them must be specifically included in the human diet for normal growth and health. Twelve are required in poultry feed. No specific amino acids need be added to feed for ruminants, such as cattle and sheep, because the animals' digestive systems can synthesize the nutrients from protein that is not complete in amino-acid composition.

Seedcoats or hulls are removed from about 60% of all soybeans processed. Hulls, high in fiber, are not satisfactory for swine or poultry, but more than 300,000 tons of them go into cattle feed annually.

In the production of food and industrial protein, dehulled and defatted meal is treated with a dilute alkaline solution to extract the protein. The residue, which is considered a byproduct, is used in livestock feed.

The water extract is treated with dilute acid to precipitate isolated or refined protein; and another byproduct, whey, which at present must be treated as sewage, is produced.

The germ is not a commercial protein fraction or byproduct. Part of it remains with the hull at the first separation step, and part goes into the dehulled meal.

J. J. Rackis, biochemist at the Northern Utilization Research and Development Division, Peoria, reported the new information as well as results of determinations for whole meal and refined protein. Coauthors with Dr. Rackis of "Amino Acid Composition of Soybean Meal and Its Fractions" are R. L. Anderson, H. A. Sasame, A. K. Smith, and C. H. VanEtten. Dr. Smith is soybean protein investigations leader in the Oilseeds Laboratory, headed by J. C. Cowan. Mr. Anderson and Mr. Sasame are organic chemists in protein investigations, and Mr. VanEtten is an analytical chemist in the Industrial Crops Laboratory.

Southern Agriculture Leader Gone

WALTER M. "Buddy" Scott on the Scott Plantation. He was a believer in deep plowing soon after combining for the next year's soybeans.

LOST TO THE American Soybean Association and to southern agriculture is a worthy and faithful director; a courteous, congenial and energetic leader; a capable and unselfish worker who gave freely of his time and talents to civic community, regional and national improvements; and a man of dynamic personality, whose devotion to mankind was as genuine as his love for his family—Walter M. Scott, Jr.

Mr. Scott, a prominent planter and business man of Tallulah, La., died Sept. 25 in a Vicksburg hospital where he was undergoing treatment. He had been severely burned in a gas explosion and fire in his plantation office 3½ weeks before.

Funeral services were held at his home Sept. 27 with interment in the Silver Cross Cemetery at Tallulah.

A native of Tallulah, Mr. Scott received his education at Tallulah High School, Castle Heights, at Lebanon, Tenn., and at the Louisiana State University where he was a life member of the alumni association. He was a member of the Kappa Alpha fraternity. He was an efficient aviator and spent 2 years in the Air Force—which tour included the South Pacific—after which he returned to the plantation and continued flying his own plane on business trips and on pleasure trips with members of his family. He was a member of the American Legion.

He had been a member of the board of directors of the American Soybean Association since 1957 and had participated in the national meeting at Memphis, Tenn., just a week before the tragic accident. He was a past member of the board of directors of the Louisiana Delta Council; a director and vice president of the Southern National Bank; a vice president of the Madison Parish Police Jury; and a member of the board of directors of the Tidelands Life Insurance Co. He was a member of the Episcopal Church.

Well known to many farmers, growers, and business men, Walter Scott was concerned principally with factors essential to profitable farm production. Cultural methods were adapted to the soil types on the plantation. He has been a stabilizing influence on Louisiana soybean seed production. He pioneered in the field of flame and chemical weed control for soybeans, when he had to chart his own course, since data were not then available.

The Scott Plantation has been a dependable source of foundation and certified soybean seed in the South. Cooperating with the Louisiana Seed Commission, it has maintained breeder's seed plots of the newer soybean varieties since their release. The Scott Plantation has its own modern seed cleaning and storage facilities.

Mr. Walter M. "Buddy" Scott was a quiet, modest thinking gentleman of only 42 years, capable of wholesome constructive analyses of the many problems and projects of his ever-active life. He always had time to give assistance to others seeking his advice and experiences. He had the leadership to enlist and inspire others to greater accomplishments. He had the vision to foresee, and the creative mind to execute practical methods of plantation and community improvement. As a friend he inspired loyal affection and as a man he engendered admiration. He had an abiding faith in friendship. One does not often come by men of his sterling personality.

He is survived by his wife, Joann; two sons and a daughter; his mother, Mrs. Walter M. Scott; his grandmother, Mrs. Henry L. Fuqua, and other relatives.

German Imports of Oilseeds up in 1960

DURING the fiscal year ending June 30, 1960, West Germany imported one-fifth more oilseeds and other oil-bearing materials than in the preceding year, according to the U. S. Department of Agriculture. Soybean imports—which accounted for more than two-thirds of total oilseed import volume—rose about 40% to reach an alltime high of over 1 million metric tons.

The United States supplied 708,000 metric tons of soybeans to West Germany in the 1959-60 fiscal year, an increase of 30% from the previous year. Nevertheless, the U. S. share of the total quantity imported fell from about three-fourths to a little over two-thirds. Mainland China, offering soybeans at prices slightly less than prices of U. S. soybeans, increased its share of the West Germany market. During the first 6 months of 1960 the price differential averaged $1.50 per ton in favor of Chinese soybeans.

SOYBEANS: WEST GERMANY[1], IMPORTS BY COUNTRY OF ORIGIN FISCAL YEARS (JULY-JUNE) 1958-59 AND 1959-60

	Tonnage		Share	
	1958-59	1959-60	1958-59	1959-60
County of origin	1,000 metric tons		Percent	
United States	546.9	708.7	74.8	68.7
China, Mainland	183.0	318.9	25.0	30.9
Other	1.2	3.6	0.2	0.4
Total	731.1	1,031.2	100.0	100.0

[1] Including West Berlin, and Saarland since July 1959.

Green Soybeans Not Satisfactory Pig Feed

OCCASIONALLY the growing season in North Dakota is such that the later maturing varieties of soybeans are caught by frost. Then comes the question of whether green, immature soybeans can be used as a pig feed.

Two North Dakota Agricultural College staff members, Clayton N. Haugse and W. E. Dinusson, have completed a study showing that raw, green, immature, frosted soybeans are not satisfactory for growing-fattening pigs when included as 7% of a pelleted barley ration.

Even mature soybeans have limitations as pig feed since rations containing over 10% soybeans reportedly cause soft, oily carcasses of inferior quality. Also, raw, uncooked soybeans are inferior in nutritive value to soybean oil meal or well-cooked soybeans for pigs.

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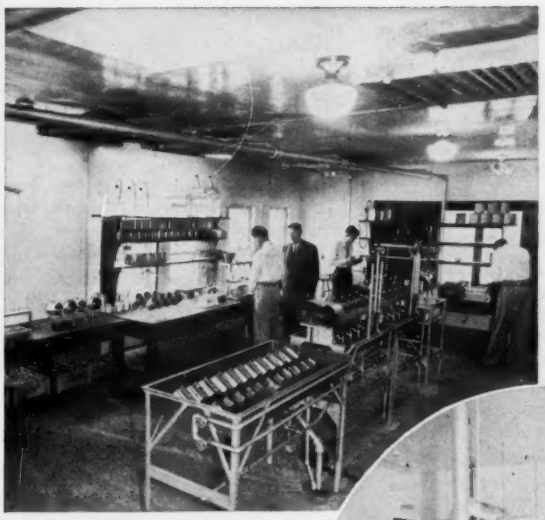

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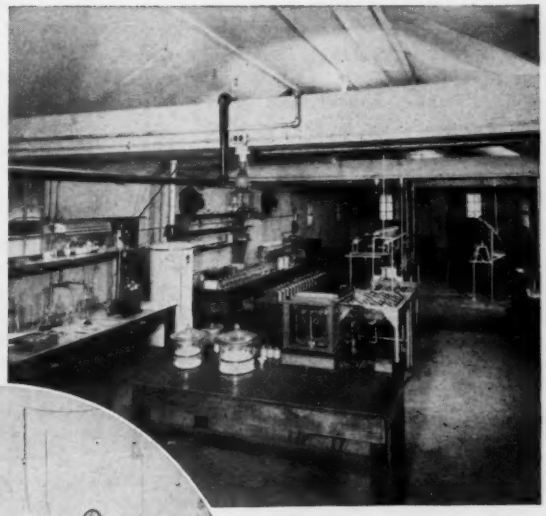

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Processor Luncheon at IKOFA Fair

WAYS OF further expanding use of U. S. soybeans in animal feeding was the principal topic of discussion at a luncheon at Munich, Germany, attended by 38 leading processors and distributors of soybean products in West Germany. Hosts at the luncheon, held at the U. S. Exhibit at the IKOFA food fair, were Clarence R. Eskildsen, agricultural attache, U. S. Embassy, Bonn, and the Soybean Council of America, Inc.

Already the largest, in dollar volume, of U. S. agricultural commodities imported by West Germany, soybean trade between the two countries is expected to increase as a growing European population and a growing livestock and poultry industry makes more and more use respectively of soybean oil and soybean meal.

West Germany exports large amounts of processed soybean meal to other European countries. Mixed feed production in West Germany last year exceeded 3.6 million metric tons. This is expected to increase as result of an inevitable expansion of animal agriculture in Western Germany.

At the same time, soybean specialists pointed out, farmers in the Federal Republic are adopting more generally the practice of balanced feeding. This is done either through an increase in the use of commercially prepared and tested complete feeds, or through an increase in the use of commercially prepared and tested concentrates. These latter are intended to contribute balanced nutrition to livestock and poultry when combined as recommended with locally produced grains and grain by-products as well as with roughages such as pasturage, hay and silage.

TWO WEST GERMAN soybean processors visit with A. D. Donnell (right), representative of the Soybean Council of America, during a luncheon at the IKOFA food fair, Munich.

It has been estimated that to provide properly balanced nutrition on farms, Western Germany farmers need to feed several times the amount of protein now used, according to James Hayward of Minneapolis, Minn., director of nutrition for the Council. Addition of vitamins and certain minerals are also essential. Usually the best and cheapest source of protein is properly toasted soybean oil meal produced by the oilseed mills in Germany, he asserted. This, in turn, offers added opportunity to U. S. soybean farmers who now produce annually some 550 million bushels, about two-thirds of the world's supply.

"To meet this opportunity, however, American farmers face a challenge to produce more high quality beans," Hayward said. "Although we know that soybeans are of tremendous significance for human consumption, we believe our best bet just now is to push their use in animal agriculture," he added.

Hold Reception for New Benelux Office

AN OPENING reception for the newly established Benelux office of the Soybean Council of America, Inc., was held recently in the Queen's Hotel in Antwerp, Belgium.

The top people of the Belgian fats and oils industry and the Belgian press put in an appearance.

People attending included W. Raymond Ogg, U. S. agricultural attache, Brussels, and Mrs. Ogg; George Falconer Wilson, U. S. consul general, Antwerp; Warren Edward Slater, U. S. consul, Antwerp; Andre de Pauw, Belgian assistant to the U. S. agricultural attache, and Mrs. de Pauw; Charles C. Gidney, Jr., European director, U. S. Feed Grains Council, Rome; Theo F. Fiedler, European director, Great Plains Wheat Associates; Henning Vontillius, European consultant for the Wheat League; and George Van Snick, Belgian Ministry of Agriculture, Brussels.

William A. Luykx, the Soybean Council's Belgian director, said the task of the Benelux office will consist mainly of exchange of information on the possibilities of an increase in the use of soybean products in Benelux countries through promotion of their use in bakeries, margarine, and in livestock feed.

OPENING reception for the Benelux office of the Soybean Council. Etienne Schoonhoven, representative of the Lloyd Anversoise, Belgian newspaper (left), interviews William A. Luykx, the Council's Benelux director.

Croll Represents Council in Asia

THOMAS C. CROLL of San Francisco is now in Asia as a special representative of the Soybean Council of America, Inc. He will explore the potential markets for soybeans, soybean meal and soybean oil for the Council in a number of Asiatic countries. Mr. Croll, who is director of export operations for Farmers Union Grain Terminal Association, St. Paul, Minn., left San Francisco for Tokyo Oct. 1.

Mr. Croll's special effort will be to determine the feasibility of establishing soy milk plants in India. Some private U. S. capital is said to be available for investing in such plants along with local capital.

Soybean milk is quite similar in nutritive content to cow's milk and has great possibilities for bettering the human diet in parts of Asia where cow's milk is not available. Mr. Croll will confer with K. S. Lo, managing director of the Hong Kong Soya Bean Products Co., at Hong Kong, where 65,000 bottles of soy milk are produced daily.

He will also meet with Ferroze H.

Thomas C. Croll

Nallaseth, Far Eastern director for the Soybean Council, and representatives of the government of India regarding the possible establishment of a soy milk plant in Calcutta.

Other stops to be made by Mr. Croll while abroad will include Manila, Philippines; Singapore; New Delhi, India; Karachi, Pakistan; Teheran, Iran; Ankara and Istanbul, Turkey; and the FAO offices in Rome.

Special Allotment for Paint Manufacturers

A SPECIAL allotment of soybean oil for Spanish paint manufacturers was recently granted by the Spanish Ministry of Commerce, according to Juan de Madariaga, deputy director of the Soybean Council of America, Inc.

This is the first grant of soybean oil to the paint manufacturers by the Spanish government.

THE COVER PICTURE

MRS. MICHIKO HAMAGUCHI was the guest of Mrs. Geo. M. Strayer and the Tuesday Study Club (Hudson, Iowa) in the home of Mrs. June Gutknecht when the photo was taken. She is a member of the Japan Soy Sauce Brewers Association visiting team which toured the United States in September and October.

Mrs. Hamaguchi is not only the wife of K. Hamaguchi, a director of the Soy Sauce Association and president of the Choshi Soysauce Co., but she is also a well-known soprano singer in Japan. She has been to Italy, Spain, Portugal, Israel and the Philippines as a representative of the Catholic church. She is the mother of three sons, the oldest now at Xavier University in Cincinnati.

Hope in Livestock Expansion

THE DEVELOPMENT of animal agriculture in countries now dependent on grain will speed the economic development of the world's less developed areas, a California animal nutritionist told the second International Animal Nutrition Symposium. He gave the keynote address at the Symposium which was held in Madrid, Spain, Oct. 18-22.

Dr. Lee C. Norris said half of the world's population exists on diets containing insufficient protein and energy and the situation will grow worse with increasing populations.

The meeting was attended by 50 scientists from the United States, Europe, and the Near East. A large number of U. S. scientists, also specialists from most European countries, took part.

The Symposium was held under the joint sponsorship of the Soybean Council and the U. S. Feed Grains Council in conjunction with the Foreign Agricultural Service of the U. S. Department of Agriculture. Howard L. Roach, president of the Council, R. W. Fischer, assistant to the president, and Walter Goeppinger, president of the Feed Grains Council, were present.

Animal agriculture will benefit less developed countries not only by raising the protein and energy potential of the food eaten by the populations of these countries but by spurring development of new industries, Dr. Norris told the Symposium.

Gate Opened to Market Work in More Countries

FUNDS ARE now available for market development work for soybeans and soybean products by the Soybean Council in Finland, Poland, and Sweden, in addition to over 40 countries already eligible for such projects, according to a recently signed amendment to the global contract between the Council and FAS. The original contract went into effect last winter.

Brazil, Portugal, and Saudi Arabia have also been added to the list of countries in which market development work can be done. The amendment made several changes in administrative procedure to facilitate compliance with government regulations.

The Council has now made commitments to participate in trade fairs in New Delhi; Zagreb, Yugoslavia; Poznan, Poland; and Lima, Peru, during 1961, assuming that active market development programs for soybeans and soybean products will be under way in Yugoslavia and Peru by that time. Exhibits at trade fairs in Cairo and Rotterdam are in the planning stages, and a number of other fairs are under consideration.

Spanish Magazine Carries Soybean News

FOR SOME TIME the Spanish office of the Soybean Council of America has been successfully broadcasting a weekly program over the Madrid radio to popularize the uses of soybean oil and feed in that country. Recently, it has entered into an agreement with Lipidos, a Spanish bi-monthly journal devoted to fats and oils, whereby the magazine has undertaken to include soybean news and other relevant material as one of its regular and fixed features.

Quoting the editor of Lipidos: "It is an indisputable fact that soybean oil is gaining markets everywhere for a reason that carries weight in the present-day world—its cheapness. And the Soybean Council of America, an organization which was founded 2½ years ago by the soybean producers and the soybean processors in the United States, has as its objective the spreading of the uses of the soybean all over the world. And it is not just a publicity entity, it is as much at the service of the consumer as of the producer."

Open New Office In Cairo, Egypt

THE CAIRO, EGYPT, office of the Soybean Council was opened Oct. 27, to administer the Council's market development program for soybeans and soybean products in that country.

Director for U. A. R. is Andre Tawa. The address of the new office is 8, Dr Abdel Hamid Said St., Cairo.

Egypt is seen as a growing market for U. S. fats and oils.

New Phone Number For Home Office

THE REGIONAL and Italian offices of the Soybean Council of America, Inc., have a new telephone number —478.951, Franco Oddone, the Council's administrative officer, reports.

The Council's Rome address is 11, Via Parigi.

Soft Tofu Offers U. S. Market

By SHIZUKA HAYASHI
Managing Director, Japanese American Soybean Institute, Nikkatsu International Bldg. No. 1, 1-Chome Yurakucho Chiyoda-Ku, Tokyo, Japan

IT HAS BEEN brought to the attention of the writer by one of the tofu manufacturers that U. S. soybeans are most suitable for manufacturing "soft tofu," which is rapidly becoming popular in Japan.

The characteristic of soft tofu is that during coagulation there is very little loss of water soluble protein whereas the loss is much greater in the manufacture of ordinary tofu. For this reason, the yield of soft tofu is much greater than is true of ordinary tofu.

Only by using U. S. soybeans or domestic soybeans combined with U. S. soybeans can such soft tofu be made. In other words, better quality and a larger yield of tofu can be produced from U. S. soybeans. This fact suggests that consumption of U. S. soybeans will increase if tofu production is confined to soft tofu. As a result of this discovery a plan has been worked out to conduct tofu manufacturing contests to encourage all the tofu makers to gradually shift to soft tofu.

The first such contest was held in Osaka last April under the joint sponsorship of the Japanese American Soybean Institute and the All Japan Tofu Press Co. Twenty-eight tofu makers chosen from the Osaka area gathered in five different tofu plants for the contest. Some of the plants used the traditional kettle cookers and some modern pressure cookers. The writer was one of the judges.

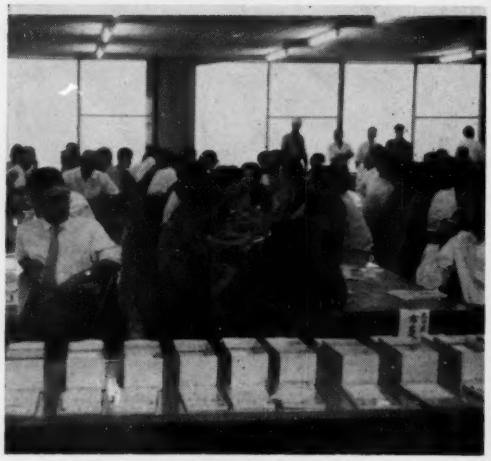
The prize was won by a Mr. Asano. His tofu was a soft tofu produced with a high pressure cooker. Through this contest the superiority of soft tofu was demonstrated.

Encouraged by this demonstration the Institute has carried out similar contests throughout Japan. In cooperation with the All Japan Tofu Association, which has over 40,000 manufacturers as members, preliminary contests were carried out in seven areas that comprised all the tofu makers in Japan.

The winners of the area contests were gathered in Tokyo for the final contest Oct. 5. The contest was televised by the Japan Broadcasting Mobile Television and later shown in the evening programs throughout Japan.

The winner was Noboru Otomo of Miyaga Prefecture. The runners-up were from the Kagawa, Kochi, Kanagawa and Miyagi prefectures. The ministers of welfare and the agricultural departments gave prizes to the winners. Here again the tofu that won the ministers' prizes was soft tofu.

A meeting for consumers and manufacturers representatives was held immediately after the inspection. Dr. Oiso of the Ministry of Welfare presided over the meeting. All present were convinced that soft tofu, unlike ordinary tofu, contains all the nutritional values of soybeans with practically no loss of water during the process. Consumers in the future will specify soft tofu instead of ordinary tofu.



SAMPLES of tofu ready for inspection in the final tofu making contest.

The Tour of the Soy Sauce Team

SHOWN ON the opposite page are some of the pictures taken of the Japan Soy Sauce visiting team during their tour of the U. S. soybean industry in September and October.

The team was composed of top executives of the Japan Soy Sauce Brewers Association and was arranged by the Japanese American Soybean Institute. The group visited not only soybean producers, but also handlers, processors and governmental agencies while in this country.

Some of their stops included: soybean processing plants of Farmers Cooperative Co., Dike, Iowa, and Ralston Purina Co., Iowa Falls, Iowa; Rath Packing Co., Waterloo, Iowa; Chicago Board of Trade and Illinois Gateway Terminal elevator; the chemurgy division, Central Soya Co., Chicago; Northern Regional Research Laboratory, Peoria, Ill.; Farmer City Grain Co., Farmer City, Ill.; University of Illinois soybean breeding plots; grain grading facilities, Agricultural Marketing Service, Memphis, Tenn.; Jacob Hartz Seed Co., Stuttgart, Ark.; New Orleans Public Elevator; U. S. Department of Agriculture, Washington, D. C.; and USDA's crops research division, Beltsville, Md.

Simultaneously with the visit of the Japanese soy sauce team, a Japanese feed team was also making a tour of the United States under the auspices of the U. S. Feed Grains Council. They also were visiting soybean processing and feed mixing plants that used soybean meal as the basic ingredient.

Accompanying the soy sauce team was David R. Farlow, assistant to the executive vice president of the American Soybean Association. He took most of the pictures.

The photos, all reading from left to right:

Top left, taking pictures of soybean combining in Illinois, H. Yamashita, C. Yamanuchi, M. Kinoshita; top right, at Rath Packing Co.'s Hilltop Farm, Waterloo, standing Hiromasa Tago, interpreter, Y. Hamaguchi, Geo. McCulley, ASA business manager, K. Hamaguchi, C. Yamanuchi, in front, K. Mogi, Mr. Mogi, Jr., A. Komiya, H. Yamashita, M. Kinoshita, and Mrs. K. Hamaguchi.

Second row, left, at the Northern Regional Research Laboratory, Peoria, Dr. C. W. Hesseltine, Mr. and Mrs. K. Hamaguchi, H. Yamashita, C. Yamanuchi, K. Mogi, Y. Hamaguchi, A. Komiya, M. Kinoshita, Dr. A. K. Smith, and W. Clifford Witham; center, at Dike, Iowa, Farmers Cooperative Co. soybean processing plant, Manager Clifford Gregory, Hiromasa Tago, and C. Yamanuchi; right, at Farmer City (Ill.) Grain Co., C. Yamanuchi, Mrs. Albert Dimond, Mrs. K. Hamaguchi, and Lew West.

Third row, left: in office of U. S. Secretary of Agriculture Ezra Taft Benson, Secretary Benson, K. Mogi, David R. Farlow, A. Komiya, H. Yamashita, and C. Yamanuchi; right, part of the group touring the Port of New Orleans on the ship Good Neighbor.

Bottom left, at Ralston Purina Co., Iowa Falls, Robert Harrington, Purina plant superintendent, and Varden Couch, manager, with Hiromasa Tago interpreting their remarks to the team; center, part of the group at the Illinois grain grading branch, Board of Trade, Chicago; right, visiting Jacob Hartz Seed Co. plant, Stuttgart, Ark., M. Kinoshita, Farlow, K. Mogi, C. Yamanuchi, Marion Hartz, A. Komiya, and Y. Hamaguchi.

Japan's Soy Sauce Team in the U.S.

CROP REPORT

Harvest Season Was Favorable in North

WITH A highly favorable harvest season most places combining of the 1960 soybean crop was well along in most northern states as of Nov. 1. Harvest was drawn out in some areas due to late planting and variation in maturity of the crop. A large part of the crop was still to be harvested in the southern and East Coast areas.

Yield reports were highly variable, but the later crop was turning out much better than earlier harvested fields—in fact, some places better than expected.

Quality of harvested beans has been generally good and apparently most of the crop went into storage in good shape. Weeds delayed harvesting in some areas, and there were some reports of high weed content in harvested beans.

Farmers apparently were selling a larger part of the crop than last year.

The U. S. Department of Agriculture as of Oct. 1 estimated the U. S. soybean crop at 561,932,000 bushels, down from 566,336,000 bushels Sept. 1 due to dry hot weather in a few major producing states in September. Main reductions came in Ohio, Missouri, and Arkansas, while Minnesota showed a 2-million-bushel increase, and there were small increases in the Dakotas. The Galvin estimate for Francis I. duPont & Co. for the same date was 555.9 million bushels.

Local and state reports by Soybean Digest correspondents:

Arkansas. Jake Hartz, Jr., Jacob Hartz Seed Co., Stuttgart (10-17): None harvested. Rain has kept combines out of fields. Cotton area grassy. Federal Oct. 1 crop report 1 bushel too high. Early beans will be poor quality due to dry weather. Stinkbug damage in some areas. We believe storage enough to handle crop. At price $1.95 to $2.00 crop will sell. At lower price crop will go into storage.

Illinois. J. E. Johnson, Champaign, (10-18): This has been a long harvest but a most satisfactory one. Moisture high enough to prevent usual damage to beans. Growers need to learn to harvest beans with higher moisture. Never a time when farmers sold for less than $1.99. Other than in hail and late seeded areas beans made a 30-bushel average.

John H. Butterfield, Pana (10-17): Some weeds but 4 weeks of dry weather eased combining. First beans yielded low, after that all were 10 bushels higher than expected.

Indiana. J. B. Edmondson, Danville (10-19): Plenty of trouble in spots with weeds. Higher yields and acreage will pile up 5% to 6% more beans than 1959. Quality good when separated from foreign material.

Louisiana. Mark H. Brown, Lake Providence (10-17): Only about 12% of all early varieties harvested. Starting on midseason beans this week. Late beans will start about Nov. 10, if weather continues dry. Some trouble with grass and weeds. Most fields clean.

Ohio. G. G. McIlroy, Irwin (10-17): Yields same or lower. Quality varies more than usual, also same can be said of yields. It has been drier this year than usual.

SOYBEANS FOR BEANS
Production, October 1960
Crop reporting board, AMS, USDA

	Yield per acre			Production		
	Average 1949-58	1959	Indicated 1960	Average 1949-58	1959	Indicated 1960
	— Bushels —			— 1,000 bushels —		
N. Y.	16.4	16.0	17.0	103	64	68
N. J.	19.7	26.0	26.0	640	1,144	1,118
Pa.	17.9	23.0	23.0	376	414	391
Ohio	23.0	26.0	25.5	26,686	38,272	39,780
Ind.	23.4	26.0	27.0	44,327	60,112	65,367
Ill.	24.6	26.5	26.0	103,099	125,610	128,050
Mich.	21.0	24.0	23.0	3,164	5,400	5,497
Wis.	15.0	18.5	16.5	975	1,758	1,518
Minn.	19.0	19.0	20.5	34,660	41,667	42,620
Iowa	23.2	26.5	26.0	48,770	63,441	66,612
Mo.	20.0	23.0	22.0	31,870	52,210	53,922
N. D.	13.7	13.0	13.0	1,314	3,029	2,756
S. D.	14.3	11.5	16.5	1,954	1,576	1,732
Nebr.	21.3	26.0	27.0	2,484	3,900	4,320
Kans.	12.4	21.0	22.0	4,756	9,114	11,462
Del.	17.8	22.5	23.5	1,825	3,442	4,277
Md.	18.6	20.5	22.0	2,480	4,202	5,280
Va.	18.4	20.5	23.0	3,682	5,966	7,015
N. C.	17.8	22.0	23.5	6,114	9,592	12,079
S. C.	12.5	16.0	17.5	2,307	5,920	7,892
Ga.	11.4	16.0	16.5	633	1,392	1,419
Fla.	19.9	23.0	25.0	496	1,058	1,075
Ky.	18.6	24.0	24.0	2,435	3,768	3,864
Tenn.	18.7	22.5	22.0	3,934	7,132	7,392
Ala.	19.4	22.5	24.0	1,833	3,150	3,504
Miss.	16.7	23.0	22.0	8,540	20,769	20,262
Ark.	18.5	24.5	22.0	19,581	56,791	54,560
La.	18.2	24.0	23.0	1,436	3,312	3,496
Okla.	12.6	21.0	22.0	544	1,428	2,420
Tex.	[1]20.3	29.0	28.0	244	2,262	2,184
U. S.	21.3	24.0	23.8	361,270	537,895	561,932

[1] Short-time average.

PUBLICATIONS

N. C. Publication Issued on Crotalaria

CHANGES in harvesting procedures for corn, soybeans and milo, have turned crotalaria, valuable for soil conservation and improvement on the East Coast, from a friend to an enemy. Crotalaria seed are poisonous to livestock and poultry. Small amounts of seed of this crop will retard development of chickens and livestock. If large amounts are mixed with feed, death will result.

The use of crotalaria must be abandoned and volunteer plants destroyed. If not eliminated, crotalaria could seriously damage the poultry and livestock industries.

Soybeans appear to offer the best possibility among the summer annuals as a replacement for crotalaria. Seed is plentiful and more reasonable in price than most of the other possible substitutes, but lime and fertilizer may be necessary to get adequate cover.

The North Carolina extension service has issued a folder describing field control methods for crotalaria, and how to eliminate it from contaminated grain.

Crotalaria — Friend Turned Foe. Extension Folder No. 186, North Carolina Agricultural Extension Service, State College Station, Raleigh, N. C.

Production of Soybeans Increasing in S. C.

SOYBEANS ARE not a major crop in Dillon County in northeastern South Carolina.

However, acreage devoted to the crop more than tripled in the 5-year period from 1954 through 1958, increasing from 700 to 2,300 acres.

Soybean production increased more than seven times in the same period, from 5,300 bushels to 39,300 bushels. Per-acre yield increased from 7.6 bushels to 17.1 bushels.

Soybean acreage in Barnwell County, in southwestern South Carolina, grew from 1,900 acres to 4,500 acres in the 1954-58 period; production from 12,700 bushels to 68,800 bushels; and yield per acre from 6.7 bushels to 15.3 bushels.

The Agriculture of Dillon County, S. C. AE 187. County Statistical Series No. 12. South Carolina Agricultural Experiment Station, Clemson, S. C.

The Agriculture of Barnwell County, S. C. AE 186. County Statistical Series No. 11. South Carolina Agricultural Experiment Station, Clemson, S. C.

Soybeans Grow in Importance in Mich.

SOYBEANS ARE increasing in importance as a cash crop in Michigan, especially in the southeastern part of the state. In one recent year farmers produced 265,000 acres of soybeans — more than double the state's 10-year average. The average yield last year was 24 bushels per acre. Most of the soybeans are produced in southeastern Michigan, 50% of the crop being grown in Monroe and Lenawee counties.

Almost all of the Michigan crop is processed.

Soybeans are adapted to areas in Michigan where corn will mature. Until the past few years, soybean varieties in use would not mature successfully north of a general line extending westward from Bay City to Muskegon. With recent development of earlier-maturing, highly productive varieties, the area of adaptation has moved farther north.

Adapted varieties, from earliest to latest in maturity are Norchief, Chippewa, Blackhawk, Harosoy, and Hawkeye.

Soybean Production in Michigan. Extension Bulletin 362. Cooperative Extension Service, East Lansing, Mich.

Three Top Producing Counties in Arkansas

MISSISSIPPI County, Ark., is now the nation's unchallenged No. 1 soybean-producing county, having replaced Champaign County, Ill., long in first place.

In 1959 Mississippi County harvested 7.3 million bushels compared with 4.77 million harvested by Champaign County.

The dramatic shift of soybean production southward in recent years is shown by the fact three of the top four soybean producing counties in the nation last year were in Arkansas. Arkansas County, Ark., was close behind Champaign County, Ill., with a 4.74-million-bushel crop. Poinsett County, Ark., was in fourth place with 4.4 million bushels. Iroquois County, Ill., was fifth with 4.2 million bushels.

However, Illinois is still far out in front as the leading soybean state. Arkansas stood in fourth place, behind Illinois, Iowa, and Indiana in 1959.

Ten counties produced between 3 and 4 million bushels in 1959, five of them in Illinois, three in Missouri and two in Arkansas.

Twenty counties produced between 2 and 3 million bushels in 1959, eight in Illinois, three in Iowa, three in Mississippi, two in Minnesota, two in Arkansas, one in Delaware and one in Ohio.

Soybeans Harvested for Beans by Counties, 1958 and 1959, Acreage Yield and Production. Agricultural Marketing Service, U. S. Department of Agriculture, Washington 25, D. C.

How Temperature Affects Plants

A JAPANESE study on the effect of high night temperatures on the growth and fruiting of soybeans indicated that high temperatures before flowering tended to produce lanky plants.

High temperatures at night retarded flowering and fruiting dates, prolonged the flowering period, increased the number of flowers but produced a small pod set. But the effect on different varieties was not the same, depending on the earliness or lateness of maturity of the variety.

The Influence of High Night Temperature on the Growth and Fruiting in the Soybean. By Kunikazu Ueki and Masami Igawa, University Farm. Technical Bulletin of Faculty of Agriculture, Kagawa University, Japan. Vol. 9, No. 3, Serial No. 26, February 1958, pages 111-118.

Fifteen N. J. Counties Now Produce Soybeans

A TOTAL of 15 New Jersey counties were listed as producing soybeans in 1958 and 1959 by the state's crop reporting service.

Total production in 1959 was 1.1 million bushels and average yield was 26 bushels per acre.

Largest producing counties are Burlington, Mercer, and Monmouth counties, all in the central district. Each produced between 200,000 and 300,000 bushels in 1959.

New Jersey Agricultural Statistics, 1958-1959. New Jersey Crop Reporting Service, U. S. Department of Agriculture, Trenton, N. J.

NEW PRODUCTS and SERVICES

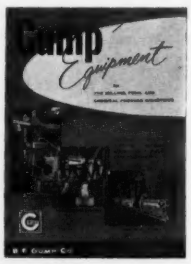
ARID-AIRE DRYER. One of the outstanding design features of the new Arid-Aire Terminal dryer is the utilization of all four sides of the unit for drying and cooling. No heat is lost through transfer of warm air because in this unique dryer there is no external warm air duct. Every bit of heat produced by the burner must go through the grain as the drying process takes place.

The Terminal dryer has a drying capacity of a carload per hour.

For further information write Soybean Digest 11d, Hudson, Iowa.

MILL CATALOG. A new catalog for the mill, food, and chemical process industries has been issued by B. F. Gump Co.

The 24-page catalog, No. 806, is a condensed presentation of the complete line of Gump equipment for these industries. Included are illustration and specifications on Draver feeders and Draver-Master continuous mixing systems, Bar-Nun rotary sifters, Edtbauer-Duplex net weighers, Gump packaging equipment, Ideal roller mills, Vibrox packers, elevators, and other Gump-built equipment.



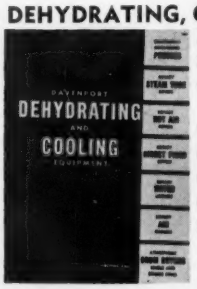
For copies of catalog 806 write Soybean Digest 11b, Hudson, Iowa.

MOISTURE CHART. A revision, effective Sept. 1, was made in the soybean charts used with the various models of Steinlite moisture tester.

Seedburo Equipment Co. states the revised soybean charts were recently mailed to all owners of model 500-RC and 400-G Steinlites. If you did not receive your revised chart, please write the Soybean Digest.

Model S and D revised soybean charts will be sent only on request. Write Soybean Digest 11a, Hudson, Iowa.

DEHYDRATING, COOLING. Davenport Machine & Foundry Co. has issued a well-illustrated new folder describing its dehydrating and cooling equipment.



Included are continuous dewatering presses, rotary steam tube driers, rotary hot air driers, rotary direct fired driers, rotary water coolers, rotary air coolers, and atmospheric drum driers.

For a copy write Soybean Digest 11e, Hudson, Iowa.

CLIPPER LINE. A folder just off the presses is called the most comprehensive piece of literature ever published by A. T. Ferrell & Co.

Not only does the folder delineate all of the major items in the Ferrell Clipper line of grain cleaners and driers, elevator legs, seed cleaners and related processing and handling equipment, but it also shows the firm's complete national and international representation and worldwide acceptance.

For a copy write Soybean Digest 11c, Hudson, Iowa.

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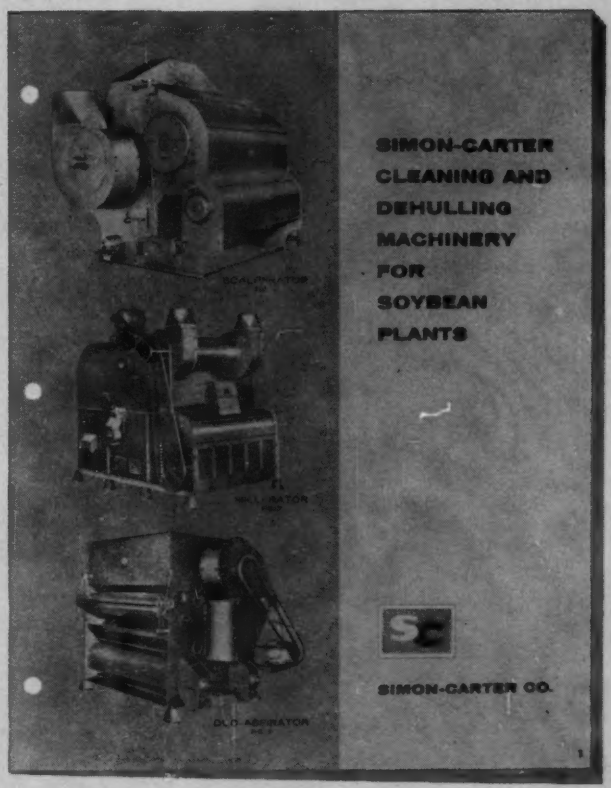
Get all the facts on modernizing your cleaning and dehulling operations. Write for your free copy of this informative 8-page booklet today.



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Please send me your new folder on Simon-Carter machinery for soybean plants.

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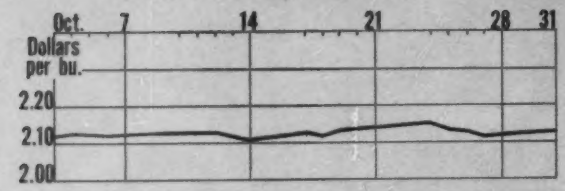
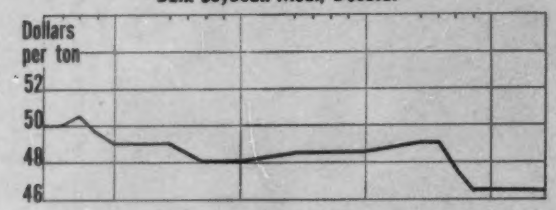
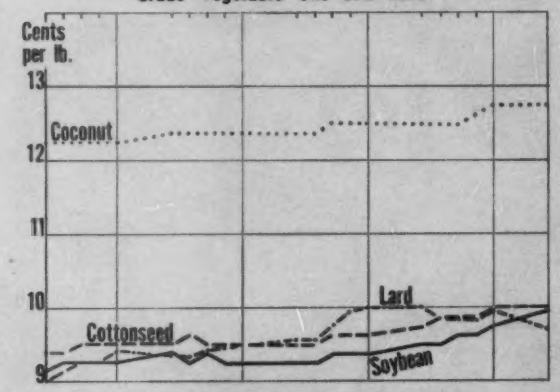
DAILY MARKET PRICES
No. 1 Cash Soybeans, Chicago



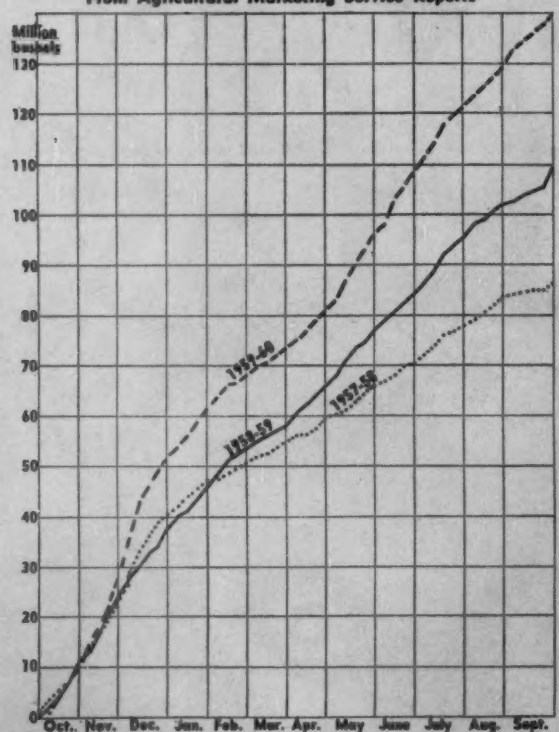
Bulk Soybean Meal, Decatur



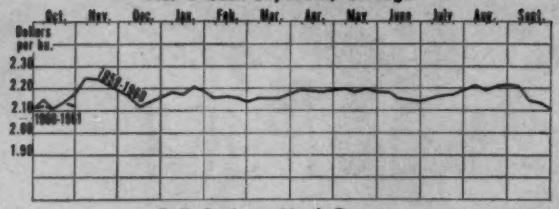
Crude Vegetable Oils and Lard



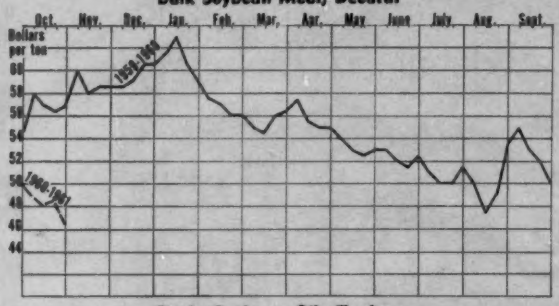
SOYBEAN INSPECTIONS FOR EXPORT, CUMULATIVE YEAR BEGINNING OCT. 1, 1957, 1958, 1959
From Agricultural Marketing Service Reports



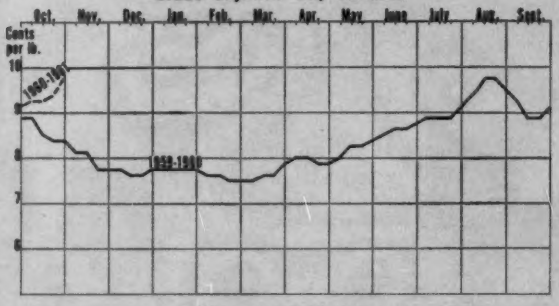
TRENDS AT A GLANCE (Weekly Close)
No. 1 Cash Soybeans, Chicago



Bulk Soybean Meal, Decatur



Crude Soybean Oil, Tankers



CASH PRICES OCTOBER*

Oct.	No. 1 yellow soybeans Chicago	Bulk soybean meal Decatur	Soybean oil Decatur	Cottonseed oil Mississippi Valley	Coconut oil Pacific Coast	Lard Chicago
3	$2.12	$50.00	$.09⅛	$.09⅜	$.12¼	$.09
4	2.12¼	50.00	.09¼	.09⅜	.12¼	.0910
5	2.12¼	50.50	.09¼	.09½	.12¼	.0925
6	2.12	49.50	.09¼	.09½	.12¼	.0925
7	2.11¾	49.00	.09¼	.09½	.12¼	.0940
8	Saturday					
10	2.12½	49.00	.09⅜	.09½	.12⅜	.0930
11	2.12¾	48.50	.09¼	.09⅝	.12⅜	.0930
12	2.12¾	48.00	.09⅜	.09½	.12⅜	.0940
13	2.11¾	48.00	.09¼	.09½	.12⅜	.0942
14	2.10¾	48.00	.09¼	.09½	.12⅜	.0950
15	Saturday					
17	2.12¼	48.50	.09¼	.09½	.12⅜	.0952
18	2.11½	48.50	.09¼	.09½	.12⅜	.0957
19	2.13	48.50	.09⅜	.09⅝	.12½	.0975
20	2.13½	48.50	.09⅜	.09⅝	.12½	.0995
21	2.13¾	48.50	.09⅜	.09⅝	.12½	.10
22	Saturday					
24	2.15	49.00	.09½	.09¾	.12½	.10
25	2.13¾	49.00	.09½	.09⅞	.12½	.0985
26	2.12¾	47.50	.09⅜	.09⅞	.12½	.0985
27	2.11½	46.50	.09⅜	.09⅞	.12⅜	.0985
28	2.12	46.50	.09¾	.10	.12¾	.0995
29	Saturday					
31	2.13	46.50	.09⅞	.10	.12¾	.0965

* From Wall Street Journal, Chicago.

1958 AND 1959 SOYBEAN CROPS

	1959	1958
Season's crush of soybeans	392,420,000 bu.	401,225,000 bu.
Net exports of soybeans	141,185,000 bu.	110,072,000 bu.

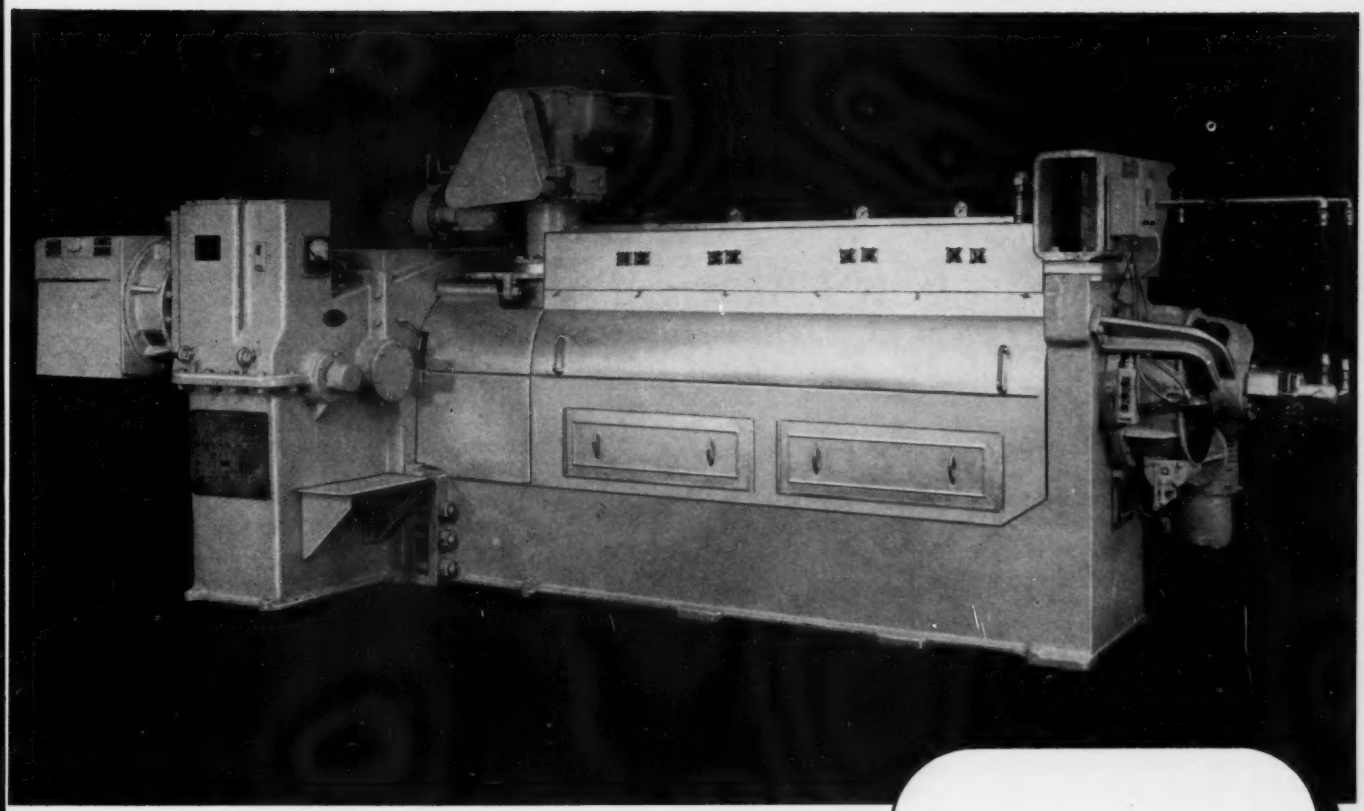
1959 AND 1960 SOYBEAN CROPS

Oct. 1 carryover of soybeans from previous crop year	23,260,000 bu.	62,117,000 bu.
Total supply of soybeans Oct. 1	585,192,000 bu.	600,012,000 bu.
Total new crop soybeans under support Sept. 30	27,627 bu.	229,820 bu.
Total soybeans inspected for overseas shipment and lake shipments to Canada Oct. 1-21	8,110,286 bu.	7,170,936 bu.

CONTINUING ITS LEADERSHIP IN THE INDUSTRY . . .

FRENCH ANNOUNCES

a New Line of Screw Presses



About six years ago after many years of research in the vegetable oil industry, The French Oil Mill Machinery Company lead the way by installing the first screw presses to average consistently less than 3.0 percent residual oil in meal. These presses have set a standard for the whole industry.

Since this initial breakthrough, developments in the screw press have been so successful that FRENCH is now ready to introduce a completely new line of presses. Designed to handle much higher capacities with improved oil yield and product quality, these new screw presses are the largest ever developed for the vegetable oil industry.

During the five years of experimental testing required to develop this new press, particular attention was given to maintenance problems. By redesigning the cage construction, devising a new method of opening the cages, and modifying the screen bar inserts, down-time for maintenance has been cut in half or less.

FRENCH screw presses continue to make possible greater profits for the industry. If you would like more information contact:

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F034

Whitlock Retires as Head Of AMS Grain Division

BERT W. WHITLOCK, director of the grain division, **Agricultural Marketing Service**, U. S. Department of Agriculture, retired Sept. 30 after 43 years service with USDA.

Mr. Whitlock is a recognized authority on grain grading, standardization and inspection, and is widely known in the grain trade in the United States.

B. W. Whitlock

He has represented the Department on several foreign missions. His latest trip was to several European countries in November and December 1959 to look over the markets for soybeans, feed grains and other commodities.

In 1952, he was given the Department's superior service award.

Mr. Whitlock was born in Reading, Vt., in 1889. He grew up in Kansas and is a graduate of Kansas State University. He entered grain inspection work in 1917 as a grain supervisor at Salt Lake City, was later in charge of federal grain inspection in the territory west of the Rocky Mountains until his transfer to Washington, D. C., in 1955 to head the grain division of AMS.

Appointment of Walter A. Davidson as director of the grain division, Agricultural Marketing Service, was announced by the U. S. Department of Agriculture. Mr. Davidson has been acting director of the division since retirement of Bert W. Whitlock Sept. 30. The appointment is effective immediately.

Mr. Davidson served as deputy director of the division for 2 years, and brings extensive experience in marketing and administration to his new post.

He joined USDA in 1931, assisting in seed law enforcement, and was a member of the Department Seed Policy Committee which drafted the Federal Seed Act of 1939. Mr. Davidson has represented the United States at several international meetings, and is a past president of the International Seed Testing Association.

W. A. Davidson

AMS' grain division plays a vital role in marketing rice, peas, beans, hay, wheat, corn, soybeans, and other grains with grading, inspection and market news activities that reach producers, dealers, processors, and consumers throughout the nation. Over 3 million certificates of quality are issued annually by about 700 inspectors licensed under the U. S. Grain Standards Act. Also administered is the Federal Seed Act, which requires imported seed to meet quality standards, requires all seed in interstate commerce to be truthfully labeled, and prohibits false advertising.

Wyllie to Do Disease Work at U. of Missouri

The appointment of Thomas D. Wyllie as assistant professor at the **University of Missouri** has been announced by Elmer R. Kiehl, dean of the College of Agriculture.

Dr. Wyllie is a plant pathologist and will be working on diseases of soybeans, cotton, and small grains. A native of California, he has an A. B. degree (1952) from San Diego State College, and M. S. and Ph. D. degrees (1957 and 1960) from the University of Minnesota.

T. D. Wyllie

His graduate research was on root rot of soybeans and he was in charge of soybean disease research at Minnesota during his study there.

Dr. Wyllie replaces Marvin D. Whitehead, former associate professor of field crops, who recently joined the staff at Edinboro College, Edinboro, Pa.

Escher of Screw Conveyor Co. Dead

Edward P. Escher, vice president and director of **Screw Conveyor Corp.**, Hammond, Ind., and Winona, Miss., also Screw Conveyor Pacific Corp., Santa Clara, Calif., passed away suddenly Oct. 10.

Edward P. Escher

Mr. Escher's duties encompassed sales and engineering since his affiliation with Screw Conveyor Corp. and he was widely known in the material handling industry, being a former chairman of the screw conveyor section of the Conveyor Equipment Manufacturers Association.

L. B. Lovitt, 81, prominent Memphis, Tenn., businessman, died at his home recently. He founded L. B. Lovitt & Co., a cottonseed firm, when he came to Memphis in 1913, and was a partner with his son in **Fred Lovitt & Co.**, a soybean meal brokerage firm. He had headed the Memphis Board of Trade and was president of the board's clearing association from 1931 until 1950.

Spencer Kellogg and Sons, Inc., announces the appointment of Howard A. Scheu as district sales manager in charge of the Minneapolis territory. Mr. Scheu suceeds Harold B. Bowen who is being transferred to Decatur, Ill., to assume new responsibilities in the soy flour

department. Mr. Sheu has been head of the flaxseed department in Minneapolis since 1953.

Several personnel changes in the production and sales departments have been announced by **Ralston Purina Co.** P. C. Winslow, assistant sales manager of the South Atlantic division headquarters, Charlotte, N. C., has been named sales manager of the Illinois division, with headquarters at Bloomington, Ill. J. F. Ballantine, general foreman at the company's plant in Wilson, N. C., became superintendent of the Memphis, Tenn., chow plant. A. J. Hinrich, a staff engineer in the company's engineering department at headquarters in St. Louis, became soybean division engineer and will continue to headquarter in the same office.

Adjustment of the local grain elevator to changing farm demand will be among the topics discussed at the 7th annual business clinic for elevator managers at **Michigan State University.** The clinic will be held in Kellogg Center Dec. 15 and 16. This year's program will include a continuing study of the functions of management and will concentrate on organizing and staffing the elevator for maximum returns.

Purchase of J & O Grain Co., one of Minneapolis' oldest grain commission firms, by **Archer-Daniels-Midland Co.,** has been announced. J & O will be a wholly owned subsidiary of ADM and will retain its separate identity.

The annual mid-winter meeting of the **Midsouth Soybean and Grain Shippers Association** will be held at the Jung Hotel, New Orleans, Feb. 20 and 21, Paul C. Hughes, secretary, has announced.

The promotion of William G. McKee, Lebanon, Ohio, from assistant territory manager to territory manager has been announced by the McMillen feed mills division of **Central Soya Co.,** Fort Wayne, Ind. He will cover southwestern Ohio. He joined McMillen in 1958.

Amend Board of Trade Futures Contract

THE CHICAGO Board of Trade soybean meal futures contract has been amended, providing feed mixers in a designated area with freight billing which can be applied to products shipped on to customers.

The "old" contract terms are in effect on futures deliveries through March 1961, with the new regulation taking effect on deliveries in May 1961 and thereafter.

Shipping certificates issued prior to the amendment may be used to effect delivery of soybean meal on futures contracts only through March 1961. For May 1961 and subsequent delivery months, new shipping certificates will be available and must be used.

Purpose of the change is to provide a contract that will furnish improved hedging protection for both soybean crushers and feed manufacturers. The "old" unrestricted contract permitted the buyer of soybean meal on futures contracts to order the meal shipped to any point in the country regardless of the freight billing behind it.

With expansion of the soybean growing area, construction of processing plants outside the heart of the soybean belt and changes in freight rates, Exchange officials felt a contract change was required. Destination territories defined under the new contract represent an area that receives a substantial amount of all soybean meal shipped by rail in the United States. The contract conforms to practices in cash meal merchandising.

WASHINGTON DIGEST

Supply Situation Seen as Tighter

By GEORGE PETER

THE SOYBEAN supplies situation ahead has shifted a bit again from one of "close balance" to "tighter." If this seems to be a fine distinction, it is. The comparison might be that between a good comfortable hug and squeezing the girl a little tighter. It make a difference.

Supply Is the Key

Total bean supply will figure more in the picture this season than it did the last for one major reason. There are fewer factors that can change. For one thing, last year you could count on the possibility of expanding exports another 30 million bushels, even though the final carryover figure showed less than that.

This year, given exports as high as the past year's record (and demand is expected to be greater), you won't have to count on such a possibility. There aren't the necessary beans. The highest carryover expected at the end of the new season is about 15 million bushels, as USDA figures it at this early date. Some industry analysts are guessing that there might not be any carryover at all.

"Tighter," as applied to supplies, means for the season as a whole. There will be plenty of beans around during the peak of the season, of course. Where they are going to be may be another matter. Whether to store or not is being recommended on the basis of how much above gross local loan sales will bring. Some observers have been arbitrarily suggesting 15¢, but this is only a guess and it applies only so long as you think you know where total supply is going.

Other factors making for a tighter overall situation, factors that can't change the picture very much later on, are the following:

Sharply reduced on-farm stocks estimated at 3.4 million bushels on Oct. 1 compared to 17.1 million a year ago. Total carryover stocks were only 23.3 million bushels in all storage positions compared to 62.1 million a year earlier, the largest portion of which was 13.6 million bushels in mills, elevators and warehouses. Processing plants held only 5.4 million bushels. The off-farm stocks included about 9 million bushels owned by CCC, a negligible factor compared to the 42 million owned by CCC this time last year. Some effect could be felt later on the maturity of crop loans, however.

USDA estimates total supplies for the season at 580-585 million bushels, or a "shade" under the record level of the past 2 years. A few more bushels might have turned up by the time you read this. On the other hand, these might be subtracted from or added to in December when the final crop report reveals adjustments in the estimated yields.

Crushing for oil and meal is not expected to differ much from the 395 million bushels USDA experts estimated for last year almost to the bushel. Final crushings figure turned out to be 392.4 or only 2.6 million off.

Bean exports are expected to be around the record 140 million bushels movement of the past year, according to USDA. We get the impression, however, that the Department wants to be conservative on bean as well as oil export predictions this early in the season and feels a bit more bullish than its official estimates show.

The major importing areas, such as Western Europe and Japan, will continue to need large imports of U. S. oilseeds or oilseed products, USDA's Foreign Agricultural Service finds. U. S. soybeans will also be competitively priced in world markets. Add to this rising world population, a more favorable dollar situation, and demand is also strengthened.

USDA isn't guessing at overall average farm prices so far this season officially. Some industry estimators are reporting "findings" that prices should average out from $2.05 to $2.10, but USDA feels this is at best only educated guessing at this point. Prices for the past year were unusually stable and averaged out at $1.97 a bushel, 12¢ above the average support price of $1.85. The supply situation was less tight, however.

Experts in USDA are also noting that the axiom, "You can't look at soybeans in a vacuum," continues to apply in sizing up the situation. How people think in a tight situation determines what they do. A tight supply situation accordingly offers speculators a better chance to talk up or talk down the market.

1961-62 Early Look

The current unusually interesting situation is also arousing earlier than usual speculation on the fats and oils situation during 1961-1962.

Looking a year ahead on the basis of data already available, the fats and oils supply should be up. The forecast also assumes no drastic changes in foreign affairs. The highlights are:

1—More cottonseed oil is predicted on the basis of the recent increase in cotton acreage allotments. Rough

early estimates suggest an increase of about 7%.

2—Increasing hog numbers next year mean more lard; also, some help for the bean meal market. A further expansion in cattle numbers and stepped-up demand for protein feeds for the poultry industry also call for more meal.

3—The corn and bean price situation should be more favorable for shifts from corn to bean production. With corn at a new lower price support and bean prices favorable in relation to bean support, marketers think shifts from corn to soybeans will accelerate.

Stinkbug Damage Is Hard to Recognize

THERE have been reports of infestations that are suspected to be stinkbugs in most of the South this year, according to Gordon Barnes, extension entomologist, University of Agriculture.

But it is very difficult to recognize stinkbug damage, according to Dr. Barnes. "It causes a specking of the beans and very definitely needs to be worked out. We have had some difficulty here in Arkansas in that every off-color or change that might be found on a soybean has been attributed to stinkbugs. This is a very serious charge and could end up costing farmers much in the way of unnecessary insecticide applications trying to reduce this thing.

"We have accomplished something this year in research and we hope before too long we will be better able to pin down the damage by stinkbugs feeding on soybeans. We do know that it takes a considerable infestation before enough damage occurs to warrant any insecticide application."

The stinkbug complex is the newest addition to the soybean insect picture in Arkansas, according to a leaflet issued by Dr. Barnes and Grover C. Dowell in September. The following is taken from the leaflet:

"There are several stinkbugs found on soybeans in Arkansas: southern green, two species of the brown stinkbug and the rice stinkbug. It is not known whether the rice stinkbug feeds on soybeans, but an Arkansas entomologist strongly suspects that they do.

"The Southern green stinkbug has several generations in a year. This insect attacks a wide variety of host plants but its preferred host is probably grasses. There are two species of brown stinkbugs. They too probably prefer grasses to soybeans, but will move into soybeans after grasses are no longer attractive to them.

"Stinkbugs have piercing and sucking mouth parts. The ability of a stinkbug to derive its food supply through its sucking mouth parts proves that they inject various enzymes into the plant tissue (bean pods, etc.) and subsequently suck back the digested material. The stinkbug injects the salivary juices which contain several enzymes . . . into the plant tissue. These enzymes aid in decomposition of plant matter."

IN THE MARKETS

EXPORTS. Preliminary data on U. S. exports of soybeans, soybean and cottonseed oils, and soybean and cottonseed cakes and meals, for August 1960, with comparable data for August 1959 and cumulative totals for October-August in the marketing years 1958-59 and 1959-60.

	Unit	August 1959[1]	August 1960	October-August 1958-59[1]	October-August 1959-60[1]
Soybeans	bu.	5,221,512	13,781,108	103,358,063	134,185,892
Soybean oil:					
Crude	lb.	70,199,323	116,422,000	409,618,067	599,395,365
Refined but not further processed	lb.	3,535,680	11,426,012	66,895,442	96,080,538
Refined, deodorized and hydrogenated	lb.	29,002,928	67,820,732	318,519,617	226,952,858
Cottonseed oil:					
Crude	lb.	8,318,513	1,842,140	229,736,898	282,466,696
Refined but not further processed	lb.	33,945,947	26,143,405	119,450,043	166,200,466
Refined, deodorized and hydrogenated	lb.	8,762,348	5,921,813	38,331,059	39,851,215
Cottonseed cake and meal	s.t.	4,720	5,841	9,915	130,948
Soybean cake and meal	s.t.	36,430	48,430	472,685	604,533

[1] Includes any revisions made by the Bureau of the Census.

Soybeans: Inspections for export by coastal areas and country of destination September 1960 (1,000 bu.)

Great Lakes	
Canada	831
Denmark	384
United Kingdom	539
Netherlands	415
Belgium	64
West Germany	685
Italy	75
Other	139
Subtotal	3,132
Atlantic	
Other	81
Subtotal	81
Gulf	
Netherlands	1,175
Belgium	19
West Germany	324
Japan	1,551
Taiwan (Formosa)	492
Other	141
Subtotal	3.702
Grand total	6,915
Total Jan-Sept '60	87,611
Total Jan-Sept '59	72,108

Based on weekly reports of inspections for export by licensed inspectors and does not include rail or truck movement to Canada or Mexico. In some cases, the ultimate destination is not shown on the inspection reports. Therefore, the quantity for each country may vary from official Census data which are based on custom declarations.

Soybeans: Inspections for export by ports and areas September 1960 (1,000 bu.)

Lake Ports	
Duluth	435
Superior	2,071
Chicago	626
Subtotal	3,132
Atlantic	
Baltimore	81
Subtotal	81
Gulf	
New Orleans	3,256
Port Allen	446
Subtotal	3,702
Totals	
Sept. 1960	6,915
Jan.-Sept. '60	87,611
Jan.-Sept. '59	72,108

Based on weekly reports of inspections for export by licensed inspectors and does not include rail and truck movement to Canada or Mexico.

Soybeans, edible oils, and oilseed cakes and meals: U. S. exports, year beginning Oct. 1, 1957 and 1958, October-August 1958-59 and 1959-60

	Unit	1957-58	1958-59[1]	October-August 1958-59[1]	October-August 1959-60[1]
Soybeans	Million bushels	85.5	110.1	103.4	134.2
Oil equivalent	Million pounds	938.9	1,208.6	1,134.9	1,473.4
Meal equivalent	1,000 short tons	2,000.9	2,608.7	2,449.6	3,153.4
Edible oils:	Million pounds				
Soybean		804.0	930.4	795.1	922.4
Cottonseed		248.0	404.2	387.5	488.5
Total		1,052.0	1,334.6	1,182.6	1,410.9
Cakes and meals	1,000 short tons				
Soybean		300.0	512.2	472.7	604.5
Cottonseed		7.2	27.3	9.9	130.9
Linseed		5.9	31.2	21.8	54.4
Total[2]		316.3	581.0	513.3	802.8

[1] Preliminary. [2] Includes peanut cake and meal and small quantities of other cakes and meals.

Soybeans: Inspections for export by coastal areas and country of destination, October 1959-September 1960

	Atlantic	Gulf	Great Lakes	Total
Canada	.....	.....	16,956	16,956
Cuba	.....	916	.....	916
Norway	836	1,031	578	2,445
Denmark	326	6,255	1,209	7,790
United Kingdom	2,194	976	870	4,040
The Netherlands	2,646	25,038	2,828	30,512
Belgium & Luxembourg	336	3,453	908	4,697
France	3,212	360	261	3,833
West Germany	196	7,108	1,979	9,283
Finland	.....	.....	347	347
Italy	299	2,770	969	4,038
Trieste	.....	78	.....	78
Israel	1,837	4,121	121	6,079
Korea	.....	1,267	.....	1,267
Hong Kong	223	.....	.....	223
Taiwan (Formosa)	2,045	2,844	.....	4,889
Japan	3,590	37,266	.....	40,856
Morocco	140	282	.....	422
Okinawa	194	37	.....	231
Other	241	73	.....	314
Total	18,315	93,875	27,026	139,216

Based on weekly reports of inspectors for export by licensed inspectors and does not include rail or truck movement to Canada or Mexico. In some cases, the ultimate destination of soybeans exported is not shown on the inspection reports. Therefore, the quantity for each country may vary from official Census data which are based on custom declarations. Agricultural Marketing Service.

Cottonseed and soybean oils and lard: Exports under Title I, P. L. 480 programs, and total exports, October 1954-August 1960 (million lbs.)

	1954-55	1955-56	Oct. 1-Sept. 30 1956-57	1957-58	1958-59	Oct. 1-Aug. 31 1958-59	1959-60
Exports under P. L. 480:							
Cottonseed	117	291	55	97	141	132	92
Soybean	.....	279	495	592	747	678	556
Total oils	117	570	550	689	888	810	[1]648
Lard	.....	112	65	3	.....	.....	.....
Total exports:							
Cottonseed	710	611	423	248	404	387	[2]472
Soybean	50	557	807	803	941	805	[2]885
Total oils	760	1,168	1,230	1,051	1,345	1,192	1,357
Lard	528	663	530	394	535	478	[2]611

[1] P. L. 480 exports are reported according to the month in which the bill of lading was dated. [2] August exports estimated.

Title I, P. L. 480 export shipments July 1960-September 1960

	September 1960 Metric tons	Unit	Quantity	July 1960-September 1960 Metric tons	Unit	Quantity
Cottonseed oil	100	lb.	220,000	9,875	lb.	21,772,000
Soybean oil	5,586	lb.	12,315,000	103,129	lb.	227,360,000

Programs operations division, Foreign Agricultural Service, U. S. Department of Agriculture.

Oilseed cake and meal: U. S. exports, August (tons)

	Monthly Aug. 1960	July 1960	Aug. 1959	Season to date Oct. 1959-Aug. 1960	Oct. 1958-Aug. 1959	Season Oct. 1958-Sept. 1959
Soybean	48,430	31,903	36,430	604,533	472,685	512,225
Cottonseed	5,841	768	4,720	130,948	9,915	27,317
Linseed	1,806	2,628	4,436	54,370	21,773	31,250

Bureau of the Census.

PRICES. Average price for soybeans received by farmers, effective parity, and support rates, reported by Agricultural Marketing Service (dollars per bushel).

Average farm price Sept. 15, 1960	Aug. 15, 1960	Sept. 15, 1959	Effective parity Sept. 15, 1960	Av. price as percent of parity Sept. 15, 1960	National average price support rate 1960 crop	1959 crop	1958 crop
1.97	199	1.90	2.90	68	1.85	1.85	2.09

Average farm and parity prices from crop reporting board.

Soybean prices compared with market value of soybean oil and meal

	Soybean oil: Average price at crushing plant Cts. per pound	Soybean oil: Value from bu. of soybeans[1] Dollars	Soybean meal: Bulk price at Decatur Dollars per ton	Soybean meal: Value from bu. of soybeans[1] Dollars	Value of oil and meal from bu. of soybeans[1] Dollars	Market price No. 1 yellow soybeans Ill. pts. Dollars per bu.	Spread between soybean price and value of oil & meal Cents
Sept. 1960	9.0	0.99	53.75	1.26	2.25	2.07	18
Aug. 1960	9.4	1.03	50.30	1.18	2.21	2.13	8
July 1960	8.9	0.98	50.75	1.19	2.17	2.09	8
June 1960	8.6	0.95	52.50	1.23	2.18	2.06	12
May 1960	8.2	0.90	54.20	1.27	2.17	2.09	8
Sept. 1959	9.1	1.00	51.70	1.21	2.21	1.98	23

[1] Based on assumption that a bushel of soybeans yields 11 pounds of oil and 47 pounds of meal. This table is for statistical comparison only. It does not reflect actual operating margins since prices are simple averages and do not take into account location differentials or actual purchases and sales of soybeans, soybean oil or soybean meal.

PROCESSING OPERATIONS. Reported by Bureau of the Census for August and September 1960 (1,000 short tons).

Primary products except crude oil at crude oil mill locations: Production, shipments and transfers, and stocks, September 1960-August 1960

Products	Production: September 1960	Production: August 1960	Shipments and transfers: September 1960	Shipments and transfers: August 1960	Stocks end of month: Sept. 30, 1960	Stocks end of month: Aug. 31, 1960
Soybean:						
Cake and meal	619.8	742.0	631.5	776.5	79.3	91.0
Millfeed (hull meal)	9.4	10.5	9.6	11.7	3.5	3.7

Soybeans: Net receipts, crushings, and stocks at oil mills, by states, September 1960-August 1960
(Thousands of short tons)

	Net receipts at mills[1]: September 1960	Net receipts at mills[1]: August 1960	Crushed or used: September 1960	Crushed or used: August 1960	Stocks at mills: Sept. 30, 1960	Stocks at mills: Aug. 31, 1960
U. S.	703.9	542.7	806.2	962.0	494.7	597.0
Arkansas	7.2	3.5	19.2	23.6	5.5	17.5
Illinois	286.4	219.5	239.8	300.8	163.3	116.6
Indiana	65.8	53.3	70.1	86.6	37.8	42.1
Iowa	77.2	122.7	163.0	171.9	88.3	174.1
Minnesota	39.1	35.0	56.7	68.4	13.7	31.4
Mississippi	(2)	(2)	(2)	(2)	5.2	1.1
Missouri	37.3	(2)	(2)	(2)	40.0	(2)
Nebraska	(2)	(2)	(2)	(2)	(2)	(2)
North Carolina	(2)	(2)	(2)	(2)	(2)	(2)
Ohio	61.7	21.8	73.5	90.9	36.2	48.0
Tennessee	28.1	30.0	61.3	75.7	15.9	49.1
All other	101.1	56.9	122.6	144.1	88.8	117.1

Note: Detail figures may not add to totals because of independent rounding. [1] Net receipts for each state are derived from the quantity of beans crushed and net change in stocks. [2] Included in "All other" to avoid disclosure of figures for individual companies.

Soybean products: Production and stocks at oil mill locations, by states, September 1960-August 1960

	Crude oil (millions of pounds) Production: September 1960	Production: August 1960	Stocks: Sept. 30, 1960	Stocks: Aug. 31, 1960	Cake and meal (thousands of tons)[1] Production: September 1960	Production: August 1960	Stocks: Sept. 30, 1960	Stocks: Aug. 31, 1960
U. S.	298.4	358.5	64.1	74.4	629.2	752.5	82.8	94.7
Arkansas	7.0	8.6	0.4	0.9	15.5	18.1	1.9	4.3
Illinois	91.0	115.2	13.2	18.2	181.8	229.5	32.2	26.9
Indiana	26.4	32.6	(2)	(2)	56.1	68.5	(2)	10.1
Iowa	59.5	63.9	12.1	20.3	130.0	138.6	16.7	20.5
Minnesota	20.3	24.6	6.4	4.4	43.2	54.7	3.8	3.7
Mississippi	(2)	(2)	(2)	0.5	(2)	(2)	0.5	2.1
Missouri	(2)	(2)	(2)	0.8	(2)	(2)	(2)	2.0
Nebraska	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
N. Carolina	(2)	(2)	(2)	0.8	(2)	(2)	0.7	1.4
Ohio	27.4	34.6	6.0	7.8	58.1	71.9	3.6	4.8
Tennessee	22.7	27.9	6.7	9.8	47.9	59.4	6.6	6.7
All other	44.1	51.1	19.3	10.9	96.6	111.8	16.8	12.2

Note: Detail figures may not add to totals because of independent rounding. [1] Includes mill feed (hull meal). [2] Included in "All other" to avoid disclosure of figures for individual companies.

MELLORINE. Production of mellorine and other frozen desserts made with fats and oils other than milkfat during September was estimated at 4,300,000 gallons, the Agricultural Marketing Service, crop reporting board, reports. This was 3% more than in September 1959 and was 35% greater than the 1954-58 average for the month. Output the first 9 months of this year was 7% larger than in the corresponding period last year.

Production of "mellorine-type" frozen desserts, United States 1960

	1954-58 average[1]	1958[1]	1959[1]	Estimated 1960	Change from: 1954-58 av.	Change from: 1959
	Thousand gallons				Percent	
January	1,862	2,243	2,273	2,595	+39	+14
February	2,098	2,341	2,464	2,920	+39	+19
March	2,605	2,767	3,360	3,400	+31	+ 1
April	2,900	3,425	3,618	3,915	+35	+ 8
May	3,435	4,120	4,173	4,405	+28	+ 6
June	3,785	4,397	4,850	5,325	+41	+10
July	4,103	4,782	5,034	4,990	+22	— 1
August	3,959	4,475	4,736	5,395	+36	+14
September	3,192	3,819	4,167	4,300	+35	+ 3
Nine month total	27,939	32,369	34,675	37,245	+33	+ 7

[1] From enumerations.

FACTORY USE VEGETABLE OILS for July and August 1960. Reported by Bureau of the Census (million pounds).

Selected edible oils: Production, consumption, and factory warehouse stocks (August 1960 and July 1960)

	Cottonseed oil: August 1960	Cottonseed oil: July 1960	Soybean oil: August 1960	Soybean oil: July 1960
Production:				
Crude oils	48.8	51.3	358.5	350.0
Refined oils (once-refined)[1]	55.9	46.9	306.7	238.5
Consumption in refining[1]	59.5	49.9	319.9	250.0
Consumption in selected edible and inedible products, total[2]	107.6	86.9	307.8	245.5
Consumption in edible products, total	107.0	86.5	290.2	227.6
Baking or frying fats	37.3	22.6	113.4	76.1
Salad or cooking oil	59.2	54.3	80.0	69.8
Margarine	9.5	8.8	89.5	79.7
Other edible products[3]	1.0	0.8	7.3	2.0
Stocks, end of month, total[2]	203.6	*286.2	314.0	450.5
Crude oils	33.5	*43.4	158.8	271.1
Refined oils	170.1	*242.8	155.2	179.4

* Revised. [1] Production of refined oils covers only once-refined oil. Degummed soybean oil is reported as crude oil. [2] Includes hydrogenated fats and other fats and oils "in process," (e.g. refined cottonseed includes stocks of stearin). [3] Includes confectioners fats.

TERMINAL STOCKS. Agricultural Marketing Service's commercial grain stocks reports for close of business on Friday or Saturday preceding date of report (1,000 bushels).

	Sept. 20	Sept. 27	Oct. 4	Oct. 11	Oct. 18
Baltimore	47	6	6	6	68
Chicago	2,226	1,984	2,097	4,632	9.398
Des Moines	684	684	684	684	684
Duluth	993	692	420	220	428
Indianapolis	153	249	941	2,248	3,213
Kansas City	90	240	719	1,289	2,172
Milwaukee	1	1	1	1	1
Minneapolis	3	1	0	2	30
New Orleans	817	754	878	1,096	1,031
Afloat	720	200	200	280	600
Omaha	19	22	20	40	177
Peoria	631	634	637	736	1,026
Philadelphia	10	101	10	32	94
Sioux City	311	250	178	124	305
St. Joseph	150	150	154	163	174
St. Louis	129	202	904	2,146	3,290
Toledo	121	137	659	2,041	3,802
Visible supply	7,105	6,307	8,508	15,740	26,493
Grand totals					
This week	7,105	6,307	8,508	15,740	26,493
Year ago		10,690	13,998	18,455	18,410

Soybeans: Barge inspected receipts and shipments by Midwest river markets, September 1959 and 1960 (1,000 bu.)

	1960	1959
Receipts		
Chattanooga	44	424
Guntersville	311	.....
Chicago	.....	1,866
St. Louis	40	29
New Orleans	3,181	1,351
Port Allen	1,024	937
Total	4,600	4,607
Shipments		
LaCrosse	40	.....
Minneapolis	565	38
Peoria	81	309
St. Joseph	183	.....
Cairo	.....	80
Alton	380	500
St. Louis	1,523	1,287
Omaha	82	.....
Henderson	283	106
Evansville	59	98
Kankakee	51	.....
Keokuk	86	92
Kansas City	.....	57
Stoneville	.....	40
Memphis	.....	41
Indiana Harbor	.....	64
Total	3,333	2,712

STOCKS. Old soybean carryover stocks in all storage positions on Oct. 1 were estimated at 23.3 million bushels by Agricultural Marketing Service crop reporting board. Although these stocks are down nearly two-thirds from a year ago they are still the second highest of record for the date. Most of the stocks—19.8 million bushels—were in off-farm positions as farm stocks amounted to only about 3.5 million bushels. Off-farm stocks include nearly 9 million bushels owned by CCC. Last Oct. 1 off-farm stocks totaled 45 million bushels of which nearly 42 million bushels were owned by CCC. In addition at that time about 13 million bushels or three-fourths of the farm stocks were stored under the government reseal program.

From an estimated supply of 600 million bushels (carryover Oct. 1, 1959, of 62 million plus 1959 preliminary production of 538 million bushels) a disappearance of about 577 million bushels was indicated for the crop year by the Oct. 1 stocks. Known disappearance for the period includes 392.4 million bushels processed for oil. About 141 million bushels were exported. Seed, feed and losses are estimated at 34 million bushels. There were also about 3 million more new-crop soybeans processed in September 1959 than comparable crushing this year. Thus actual disappearance for the crop year totals about 570 million bushels. This gives a difference of slightly over 1% from the indication of production and stocks.

Stocks of soybeans, Oct. 1, 1960, with comparisons (1,000 bu.)

	Oct. 1 av. 1949-58	Oct. 1 1959	July 1 1960	Oct. 1 1960
On farms[1]	2,614	17,105	42,140	3,433
Commodity Credit Corp.[2]	367	873	407	843
Processing plants[4]	970	4,217	43,050	5,381
Mills, elev. & whses.[1 3]	3,046	39,922	50,753	13,603
Total	6,998	62,117	136,350	23,260

[1] Estimates of the crop reporting board. [2] Old crop owned by CCC and stored in bins or other storages owned or controlled by CCC; other CCC-owned grain is included in the estimates by positions. [3] All off-farm storages not otherwise designated, including flour mills and terminal elevators. [4] October estimates reported by crop reporting board. July estimates reported by Bureau of the Census.

Soybeans (old crop): Total and off-farm stocks, Oct. 1 and July 1 (1,000 bu.)

	Off-farm total[1]			Total all positions[2]		
	Oct. 1, 1959	July 1, 1960	Oct. 1, 1960	Oct. 1, 1959	July 1, 1960	Oct. 1, 1960
Ohio	760	5,544	137	1,135	7,840	328
Ind.	1,144	3,742	363	2,063	8,551	543
Ill.	10,119	20,579	2,781	12,247	31,884	3,660
Minn.	10,270	9,379	963	14,585	15,629	1,296
Iowa	17,828	22,885	10,097	24,979	33,036	10,731
Mo.	1,688	*	594	2,242	*	1,116
S. Dak.	253	396	324	402	585	340
N. C.	*	1,953	474	*	2,097	570
Tenn.	278	4,760	*	284	4,831	*
Miss.	*	979	3	*	1,394	65
Ark.	33	2,874	6	83	3,158	63
Other	2,639	21,119	4,085	4,097	27,345	4,548
U. S.	45,012	94,210	19,827	62,117	136,350	23,260

* Included in other states to avoid disclosing individual operations. [1] Includes stocks at mills, elevators and warehouses, terminals and those owned by Commodity Credit Corp. which are in bins and other storages under CCC control. [2] Off-farm total plus farm stocks.

STOCKS ON FARMS. Stocks of old-crop soybeans on farms Oct. 1 are estimated at 3.4 million bushels by the USDA crop reporting board. This compares with the record high of 17.1 million bushels a year earlier when a large part of the stocks was stored on farms under the 1958 reseal program. The 10-year Oct. 1 farm stocks averaged 2.6 million bushels.

Old-crop soybean stocks on farms Oct. 1 (1,000 bu.)

	Average 1949-58	1959	1960		Average 1949-58	1959	1960
N. Y.	6	5	3	Md.	24	21	17
N. J.	8	6	11	Va.	23	12	60
Pa.	17	10	10	N. C.	51	209	96
Ohio	282	375	191	S. C.	18	28	30
Ind.	301	919	180	Ga.	6	11	14
Ill.	562	2,128	879	Fla.	[1]	.....	.....
Mich.	17	244	27	Ky.	12	19	26
Wis.	19	70	44	Tenn.	16	6	36
Minn.	373	4,315	333	Ala.	6	.....	16
Iowa	492	7,151	634	Miss.	14	.....	62
Mo.	179	554	522	Ark.	39	50	57
N. Dak.	22	260	30	La.	2	.....	33
S. Dak.	57	149	16	Okla.	4	5	7
Nebr.	20	433	39	Texas	1	14	11
Kans.	32	93	46	U. S.	2,614	17,105	3,433
Del.	13	18	3				

[1] Less than 500 bushels. Crop reporting board, AMS, USDA.

Oilseed meals: Production, stocks, foreign trade, and domestic disappearance, October-August 1959-60 and 1958-59 (1,000 tons)

	Stocks[1] Oct. 1	Production	Imports [2]	Exports [2]	Domestic disappearance	Stocks[1] Aug. 31
		October 1959-August 1960				
Soybean	58.5	8,497.7	..	586.1	7,875.4	94.7
Cottonseed	97.0	2,333.2	31.0	125.6	2,177.9	157.7
Linseed	33.3	320.3	2.2	56.1	272.7	27.0
Copra	..	120.9	7.6	..	122.0	6.5
Peanut	1.8	58.1	0	..	56.5	3.4
Total	190.6	11,330.2	40.8	767.8	10,504.5	289.3
		October 1958-August 1959				
Soybean	48.1	8,842.3	0	472.7	8,316.1	101.6
Cottonseed	71.2	1,926.7	125.9	9.9	2,026.1	87.8
Linseed	26.3	397.6	3.7	21.8	383.1	22.7
Copra	0.6	104.1	30.6	..	135.3	..
Peanut	1.5	71.0	0	..	70.7	1.8
Total	147.7	11,341.7	160.2	504.4	10,931.3	213.9

Dash indicates data is not available. [1] Stocks at processing plants only. [2] Partly estimated.

PRICE SUPPORT. Quantities of 1960-crop soybeans put under support through September 1960 compared to 1959-crop totals a year earlier, reported by Agricultural Marketing Service, U. S. Department of Agriculture (bushels).

Warehouse-stored loans	Farm-stored loans	Purchase agreements	Total put under support through Sept. 30, 1960	Total put under support through Sept. 30, 1959
26,459	0	1,168	27,627	229,820

Soybeans: CCC-owned stocks, Oct. 1, 1960 (1,000 bu.)

Indiana	8	North Dakota	[1]
Illinois	851	South Dakota	59
Wisconsin	1	Nebraska	383
Minnesota	22	Kansas	42
Iowa	6,769	Oklahoma	1
Missouri	292	Evanston area[2]	64
		Total	8,492

[1] Less than 500 bushels. [2] In transit. CSS Grain Division.

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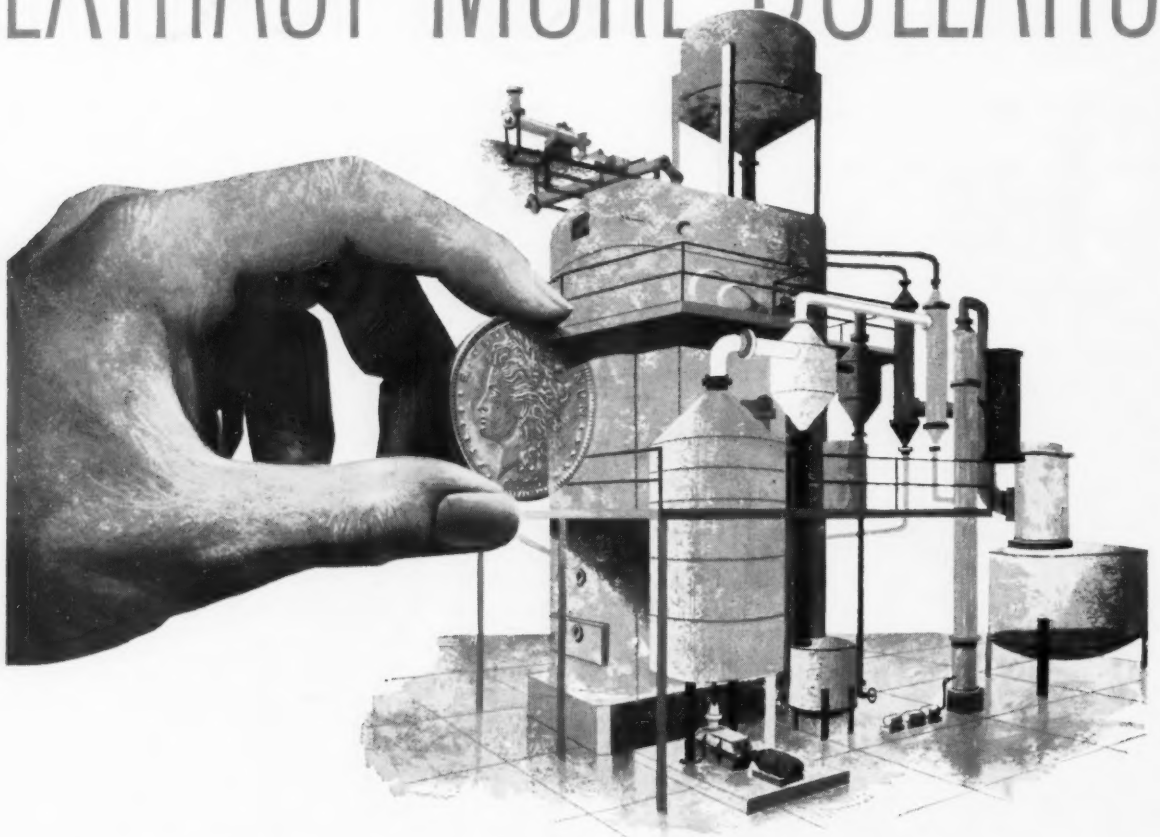

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